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AN ATLAS
OF
HUMAN ANATOMY
FOR STUDENTS AND PHYSICIANS

BY
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ASSISTED BY
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Adapted to English and American and International Terminology

BY
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FIFTH SECTION
F. ANGIOLOGY
(FIGURES 933 TO 1123 AND INDEX)
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ANGEIOLOGY—GENERAL CONSIDERATIONS

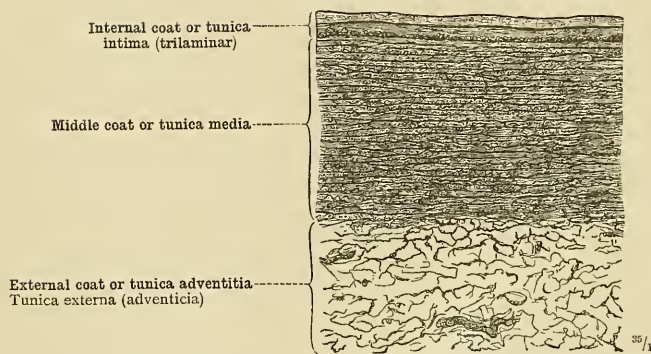


FIG. 933.—PART OF A TRANSVERSE SECTION THROUGH THE WALL OF THE DESCENDING THORACIC AORTA (HUMAN); INTERNAL, MIDDLE AND EXTERNAL COATS; TUNICA INTIMA, MEDIA, ET EXTERNA.

In the external coat sections of two vasa vasorum are seen.

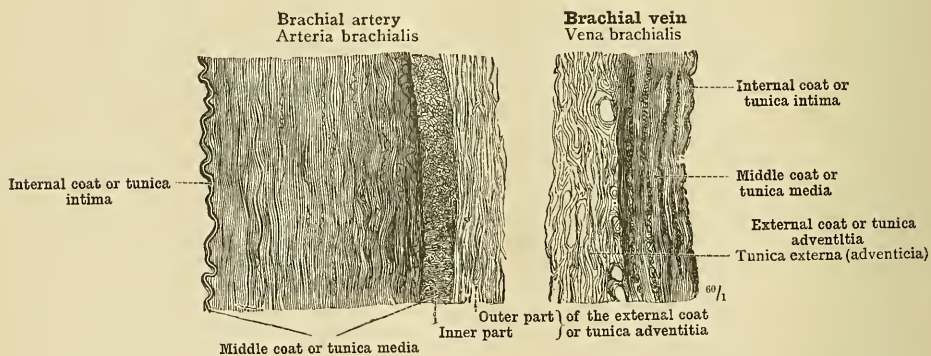


FIG. 934.—PART OF A TRANSVERSE SECTION THROUGH THE CUBITAL PORTION OF THE BRACHIAL ARTERY AND VEIN (HUMAN).

The Layers of the Walls of the Bloodvessels.

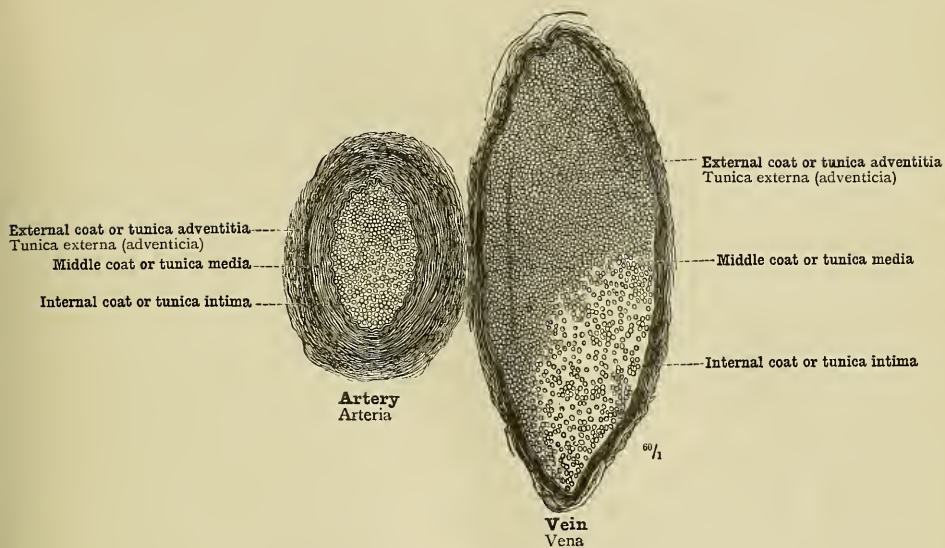


FIG. 935.—TRANSVERSE SECTION THROUGH AN ARTERY OF THE MESENTERY AND ITS ACCOMPANYING VEIN (HUMAN).

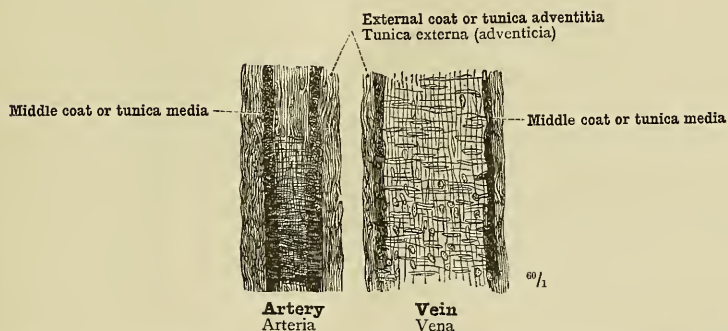


FIG. 936.—LONGITUDINAL SECTION OF A SMALL ARTERY AND VEIN OF THE PANCREAS.

The Layers of the Walls of the Bloodvessels.

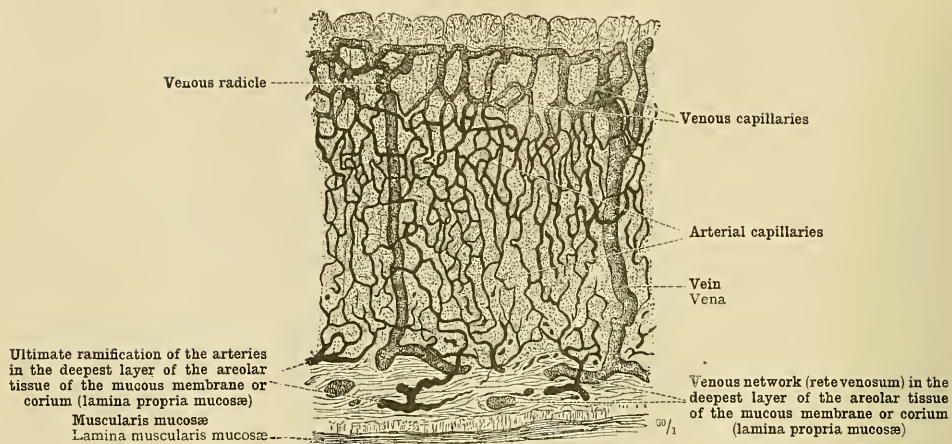


FIG. 937.—BLOODVESSELS OF THE GASTRIC MUCOUS MEMBRANE IN VERTICAL SECTION: VASA CAPILLARIA, CAPILLARY VESSELS, AND THEIR CONNEXION WITH THE ARTERIES AND THE VEINS.

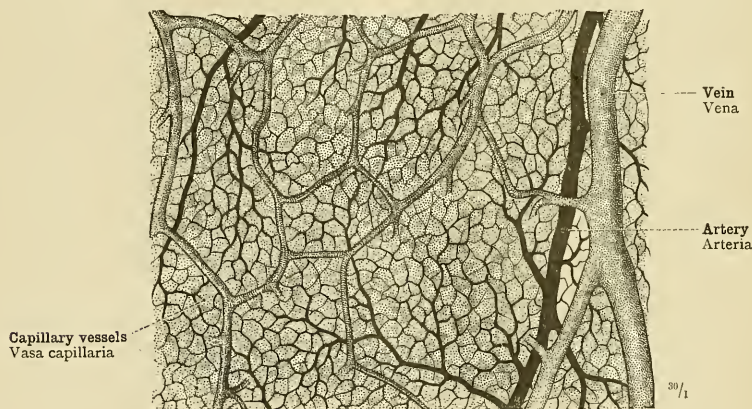


FIG. 938.—THE VENOUS NETWORK, RETE VENOSUM, AND THE ULTIMATE RAMIFICATION OF THE ARTERIES IN THE DEEPEST LAYER OF THE CORIUM (LAMINA PROPRIA MUCOSÆ) OF THE GASTRIC MUCOUS MEMBRANE.

The plane of the vascular network is parallel with the surface of the mucous membrane.

The Capillary and Subcapillary Vascular Ramification.



FIG. 939.—VALVED SUBCAPILLARY LYMPHATIC VESSELS (VASA LYMPHATICA) FROM THE SUB-MUCOUS LYMPHATIC PLEXUS OF THE HUMAN OCULAR CONJUNCTIVA (CONJUNCTIVA BULBI), INJECTED WITH TRANSPARENT GELATIN.

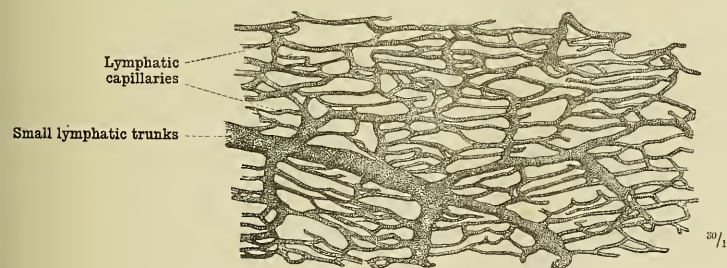


FIG. 940.—LYMPHATIC CAPILLARIES FROM THE MUSCULAR COAT OF THE STOMACH OF THE FROG, INJECTED WITH OPAQUE YELLOW GELATIN.

The Capillary and Subcapillary Lymphatics (Vasa Lymphatica).

Septum of the sheath of the bloodvessels, or septum vaginae vasorum—Septum vaginae vasorum

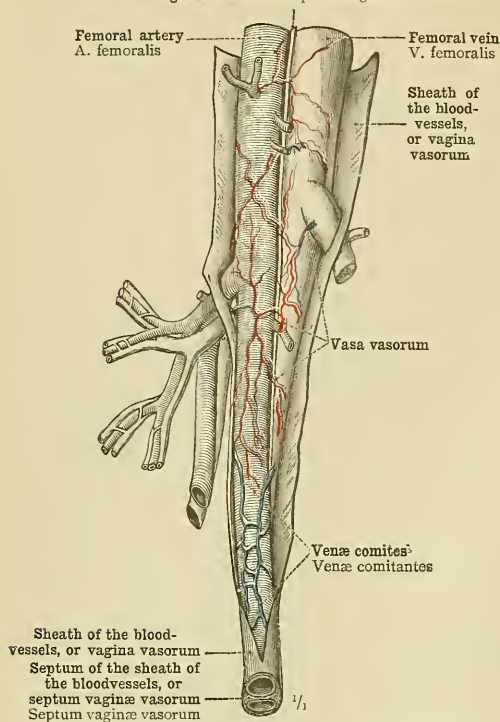


FIG. 941.—THE SHEATH OF THE FEMORAL ARTERY AND VEIN, OPENED. THE VASA VASORUM AND THE VENÆ COMITES¹ OF THE FEMORAL ARTERY. SEMIDIAGRAMMATIC.

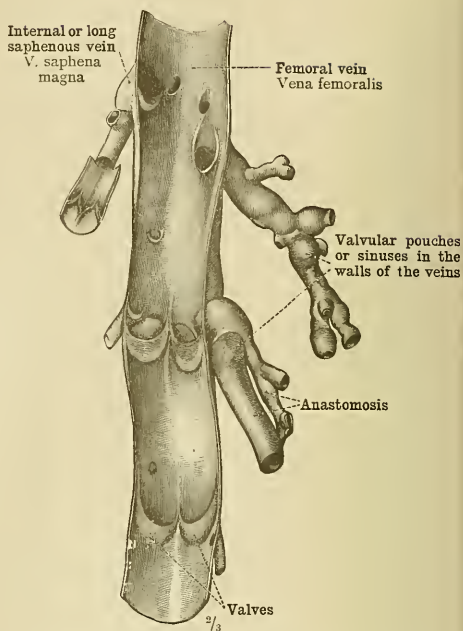


FIG. 942.—THE VALVES OF THE EXCISED FEMORAL VEIN AND ITS BRANCHES.

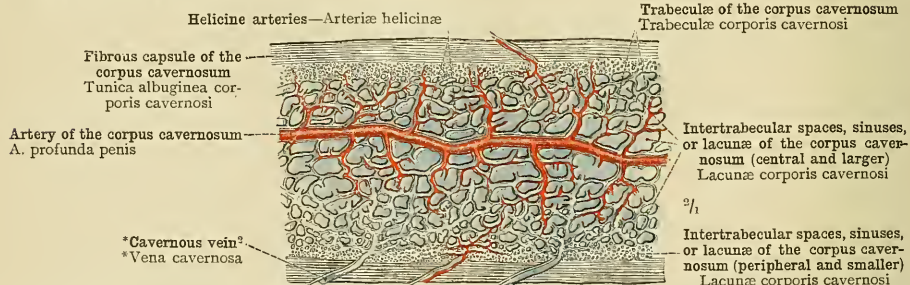


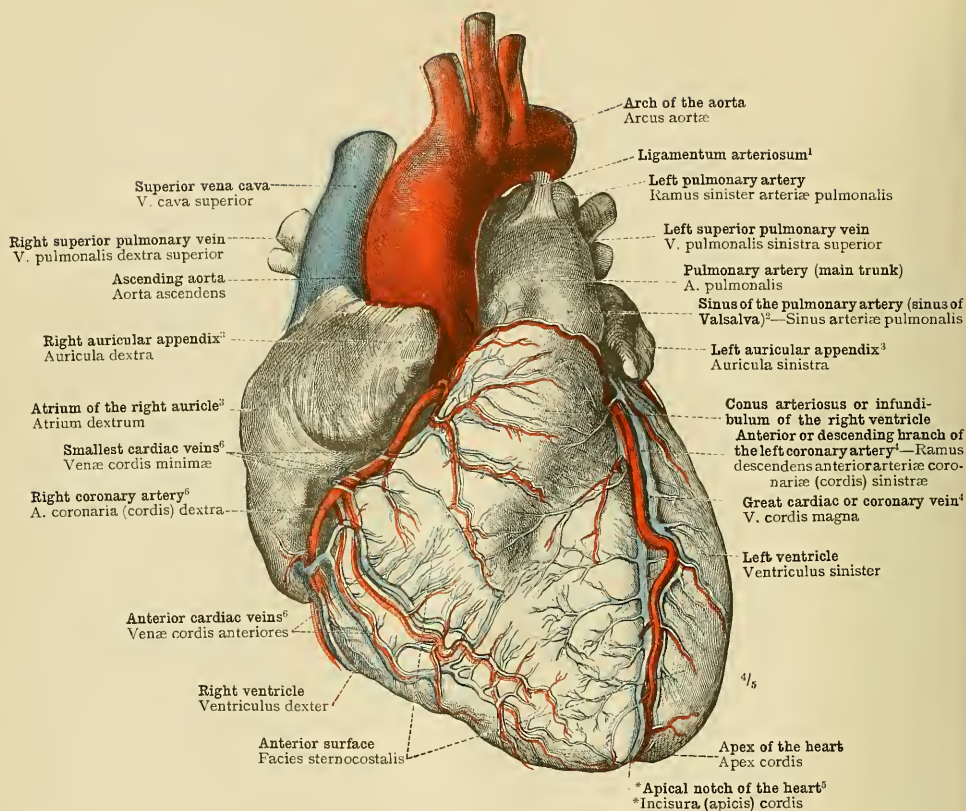
FIG. 943.—LONGITUDINAL SECTION THROUGH THE CORPUS CAVERNOSUM OF THE PENIS; RAMIFICATION OF THE ARTERY OF THE CORPUS CAVERNOSUM (ARTERIA PROFUNDA PENIS); ARTERIÆ HELICINÆ, HELICINE ARTERIES; VENÆ CAVERNOSÆ, *CAVERNOSUS VEINS²; THE FIBROUS CAPSULE, THE TRABECULÆ, AND THE INTERTRABECULAR SPACES, SINUSES, OR LACUNÆ OF THE CORPUS CAVERNOSUM. SEMIDIAGRAMMATIC.

¹ In full, *venæ comites vel satellites arteriarum*.

² *Venæ Cavernosæ*.—The venous blood leaves the corpora cavernosa of the penis by two roots. A larger moiety leaves the crura to join the internal pudic veins by the veins of the corpora cavernosa (corresponding to the arteries of the same name). The remainder passes by small veins which pierce the fibrous capsule of the corpora cavernosa in the free region of the penis, and, anastomosing with cutaneous veins, join the dorsal vein of the penis. These latter are called by Toldt *cavernous veins*.—Tr.

Vasa vasorum.—Vagina vasorum, the sheath of the bloodvessels.—The valves of the veins.—Corpus cavernosum of the penis.

COR
THE HEART



¹ See Appendix, note 111.

² See Appendix, note 112.

³ See Appendix, note 113.

⁴ These vessels are named by Macalister the *anterior interventricular artery and vein*.—Tr.

⁵ **Apical Notch of the Heart*.—This is merely the apical portion of the *interventricular groove, furrow, or sulcus*.—Tr.

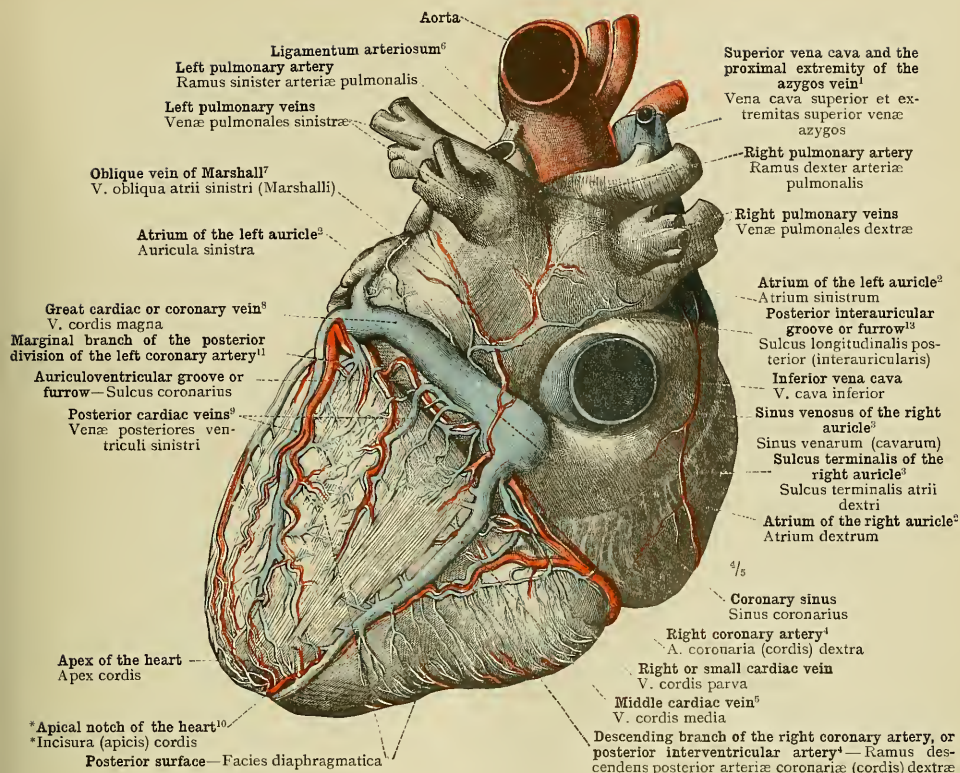
⁶ See Appendix, note 114.

⁷ *Borders of the Heart*.—These are not mentioned by the author in the original work. The *upper or left border*, conspicuous in the present figure, is shorter, rounder, and thicker than the other, hence it is often called *margo obtusus*; the *lower or right border*, conspicuous in Fig. 945, is longer, and is thin compared with the other; for this reason it is distinguished as *margo acutus*.—Tr.

FIG. 944.—THE HEART SEEN FROM BEFORE, WITH INJECTED CORONARY VESSELS: THE RIGHT CORONARY ARTERY, ARTERIA CORONARIA (CORDIS) DEXTRA; THE ANTERIOR OR DESCENDING BRANCH OF THE LEFT CORONARY ARTERY; THE COMMENCEMENT OF THE GREAT CARDIAC OR CORONARY VEIN, VENA CORDIS MAGNA; THE ANTERIOR CARDIAC AND THE SMALLEST CARDIAC VEINS, VENÆ CORDIS ANTERIORES ET VENÆ CORDIS MINIMÆ. THE LIGAMENTUM ARTERIOSUM, OR LIGAMENT OF BOTALLUS (see Appendix, note 111). MARGO OBTUSUS CORDIS, THE UPPER OR LEFT BORDER OF THE HEART (see note 7 above).

The cavities of the heart have been injected with tallow.

External Appearance and Bloodvessels of the Heart.



¹ Sometimes called the *right* or *large azygos vein*.

³ See Appendix, note 115.

⁵ Named by Macalister the *posterior interventricular vein*.

⁷ See Appendix, note 117.

⁹ Called by Macalister the *left marginal vein*.

¹¹ Named by Macalister the *left marginal artery*.

¹³ See note 5 to p. 566.

² See Appendix, note 113.

⁴ See Appendix, note 116.

⁶ See Appendix, note 111.

⁸ Ending in the *coronary sinus*.

¹⁰ See note 5 to p. 562.

¹² See Appendix, note 116.

FIG. 945.—THE HEART SEEN FROM BEHIND, WITH INJECTED CORONARY VESSELS: THE RIGHT CORONARY ARTERY, ARTERIA CORONARIA (CORDIS) DEXTRA, WITH ITS DESCENDING BRANCH, RAMUS DESCENDENS POSTERIOR (POSTERIOR INTERVENTRICULAR ARTERY); THE POSTERIOR OR TRANSVERSE BRANCH OF THE LEFT CORONARY ARTERY, RAMUS CIRCUMFLEXUS ARTERIÆ CORONARIÆ (CORDIS) SINISTRÆ, GIVING OFF THE LARGE MARGINAL BRANCH; THE GREAT CARDIAC OR CORONARY VEIN, VENA CORDIS MAGNA, TERMINATING IN THE CORONARY SINUS, SINUS CORONARIUS; THE MIDDLE AND THE RIGHT OR SMALL CARDIAC VEINS, VENÆ CORDIS MEDIA ET PARVA; THE OBLIQUE VEIN OF MARSHALL, VENA OBLIQUA, ATRII SINISTRI (MARSHALLI). THE SULCUS TERMINALIS OF THE RIGHT AURICLE, SULCUS TERMINALIS ATRII DEXTRI; AND THE SINUS VENOSUS, SINUS VENARUM (CAVARUM). *CORONA CORDIS (see Appendix, note 118), BASIS CORDIS (see Appendix, note 128), AND THE INFERIOR SURFACE (FACIES DIAPHRAGMATICA) OF THE HEART. MARGO ACUTUS CORDIS, THE LOWER OR RIGHT BORDER OF THE HEART (see note 7 on p. 562).

The same preparation as that seen in Fig. 944, viewed in this case from behind.

External Appearance and Bloodvessels of the Heart.

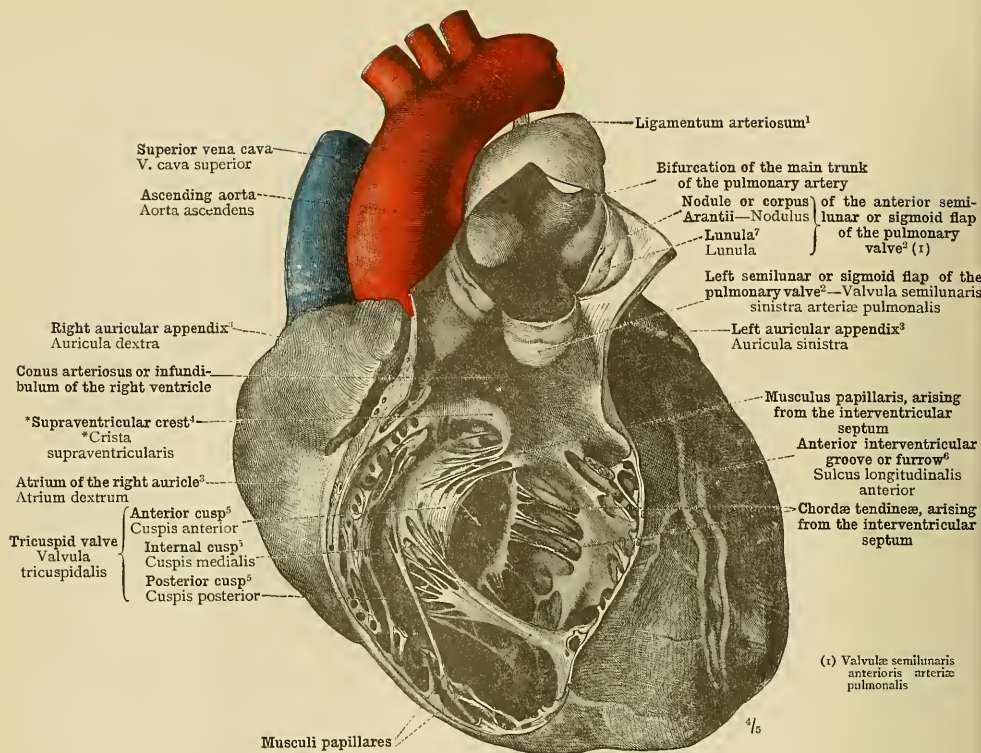


FIG. 946.—THE HEART SEEN FROM BEFORE.

The anterior wall of the right ventricle and of the conus arteriosus or infundibulum has been removed; the main trunk of the pulmonary artery, arteria pulmonalis, has been opened by an incision passing from a point between the anterior and the right semilunar or sigmoid flaps of the pulmonary valve² to the bifurcation, and the anterior wall of the artery has been turned to the left. In this manner the tricuspid valve, valvula tricuspidalis, with its papillary muscles, musculi papillares, and tendinous chords, chordae tendineae, and also the semilunar or sigmoid flaps of the pulmonary valve with their nodules, or corpora Arantii, and lunulae, have been brought into view. The heart had previously been hardened in the distended state (*i.e.*, in diastole) by immersion in chromic acid solution and alcohol.

¹ See Appendix, note 111.

² *Flaps of the Aortic and Pulmonary Valves.*—These are differently designated by different authorities. 1. The *Pulmonary Valve.* According to Von Langer and Toldt, the flaps of this valve are *anterior, right, and left*; according to Quain, they are *right, left, and posterior*; and according to Macalister, they are (1) *anterior* and to the left, (2) *posterior* and to the right, and (3) *posterior* and to the left. 11. The *Aortic Valve.* According to Von Langer and Toldt, the flaps of this valve are *posterior, right, and left*; according to Quain, they are *anterior, right, and left*; and according to Macalister, they are (1) *behind* and to the right, (2) *forward* and to the right, and (3) *forward* and to the left. The position of these flaps can be accurately determined only by the examination of frozen sections of the thorax. The eleventh plate of Braune's "Atlas of Topographical Anatomy" (English edition) gives an excellent view of the aortic and pulmonary valves, and if the arrangement there figured is a normal one, Quain's description is certainly to be preferred. In the text, however, I follow Toldt's nomenclature of the flaps.—Tr.

³ See Appendix, note 113.

⁴ *Supraventricular Crest.*—"On the inner wall of the right ventricle, between the *ostium venosum* (tricuspid orifice) and the conus arteriosus (or infundibulum), there is an eminence that projects freely into the ventricular cavity; this is the *crista supraventricularis*. Thus, whereas on the left side of the heart the mitral and aortic orifices are closely approximated one to the other, and are surrounded by a common ring of muscular tissue, on the right side of the heart the tricuspid and pulmonary orifices are a little distance apart, and each is surrounded by its own ring of muscular tissue." (Von Langer and Toldt, *op. cit.*, p. 481). Quain (*op. cit.*, vol. II, part II, pp. 363, 359), speaking of the tricuspid and pulmonary orifices, writes: "Between the two the wall of the cavity projects downwards in the form of a thick, rounded muscular partition, which corresponds to the beginning of the aorta from the left ventricle"; but he gives the structure in question no name. Macalister (*op. cit.*, p. 327) writes: "Between the auriculoventricular and the pulmonary openings is an area in the septal wall crossed by oblique pillars, called the *fleshy fons*."—Tr.

⁵ *Tricuspid Valve.*—The *cusps* or *flaps* of this valve are variously named by different authorities. *Cuspis anterior*, the *anterior cusp* of Toldt, is similarly named by Macalister, but by Quain is called the *infundibular or left flap*; *cuspis medialis*, the *internal cusp* of Toldt, is called the *right flap* both by Quain and by Macalister; *cuspis posterior*, the *posterior cusp* of Toldt, is called *posterior* also by Macalister, and by Quain the *posterior or septal flap*.—Tr.

⁶ See note 5 to p. 566.

⁷ *Lunula.*—This term denotes the thin, narrow portion at the free edge of the semilunar flaps of the aortic and pulmonary valves. Toldt, however, describes one lunula in each flap, in the middle of which is the nodule or corpus Arantii; whereas English anatomists recognise two lunulae in each flap, separated from one another by the nodule.—Tr.

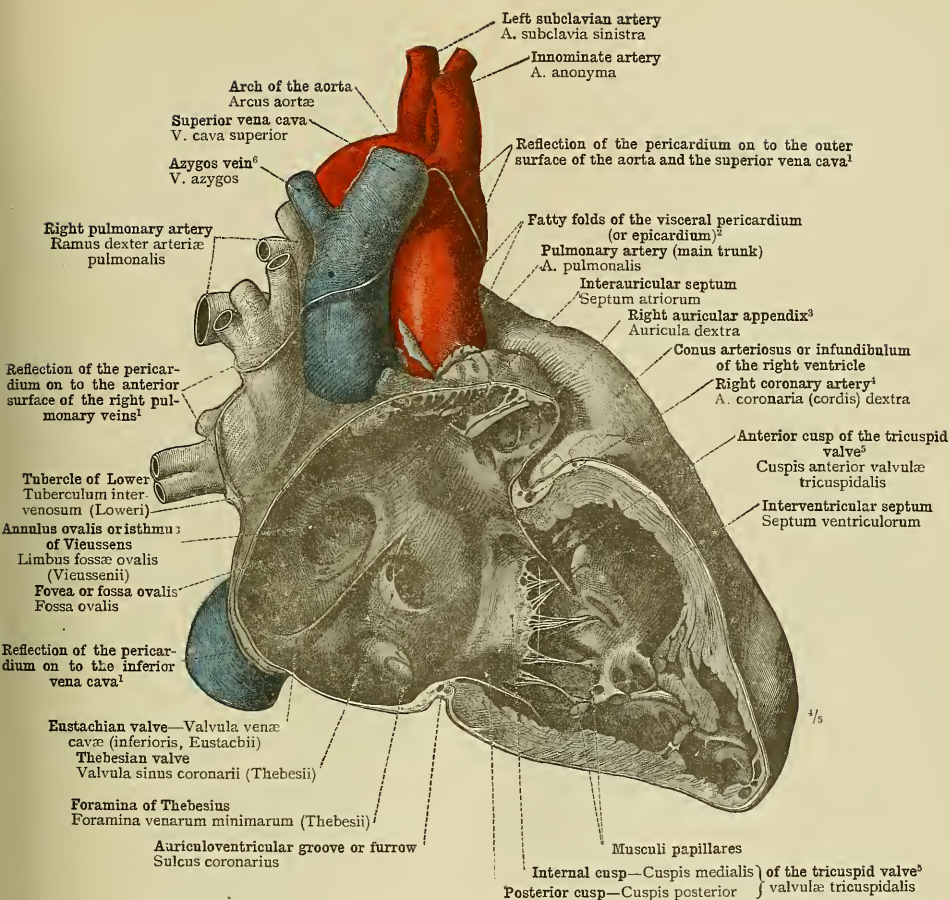


FIG. 947.—THE HEART SEEN FROM THE RIGHT SIDE.

The heart having been hardened in formalin in the distended state (*i.e.*, in diastole), the right portion of the ventricles and the auricles was removed by a section passing upwards from the apex of the heart to the outer side of the orifices of the superior and inferior venæ cavæ. In the right ventricle, ventriculus dexter, the following structures are seen: The anterior, posterior, and internal cusps of the tricuspid valve (*see note* ⁶ to p. 564), also the musculi papillares and the chordæ tendinæ that arise from the interventricular septum. In the right auricle we see the fovea or fossa ovalis, with the annulus ovalis or isthmus of Vieussens, and the tubercle of Lower; also the orifices of the venæ cavæ, the Eustachian valve, the orifice of the coronary sinus with the Thebesian valve, and the cavity of the right auricular appendix (auricula dextra). On the aorta, the superior vena cava, and the right pulmonary veins, we see the reflection of the parietal pericardium to form the visceral pericardium (*see note* ² above).

¹ Or junction of the *parietal* and *visceral* pericardium (*see also note* ²).

² *Epicardium*.—The pericardium, like other serous membranes, consists of *outer* and *inner*, or *parietal* and *visceral* layers. The *visceral* or *cardiac* pericardium is called by Toldt the *epicardium*, and the latter name is occasionally used also in England.—Tr.

³ *See Appendix, note* ¹¹³.

⁴ *See Appendix, note* ¹¹⁴.

⁵ *See note* ⁵ to p. 564.

⁶ Sometimes called the *right* or *large azygos vein*.

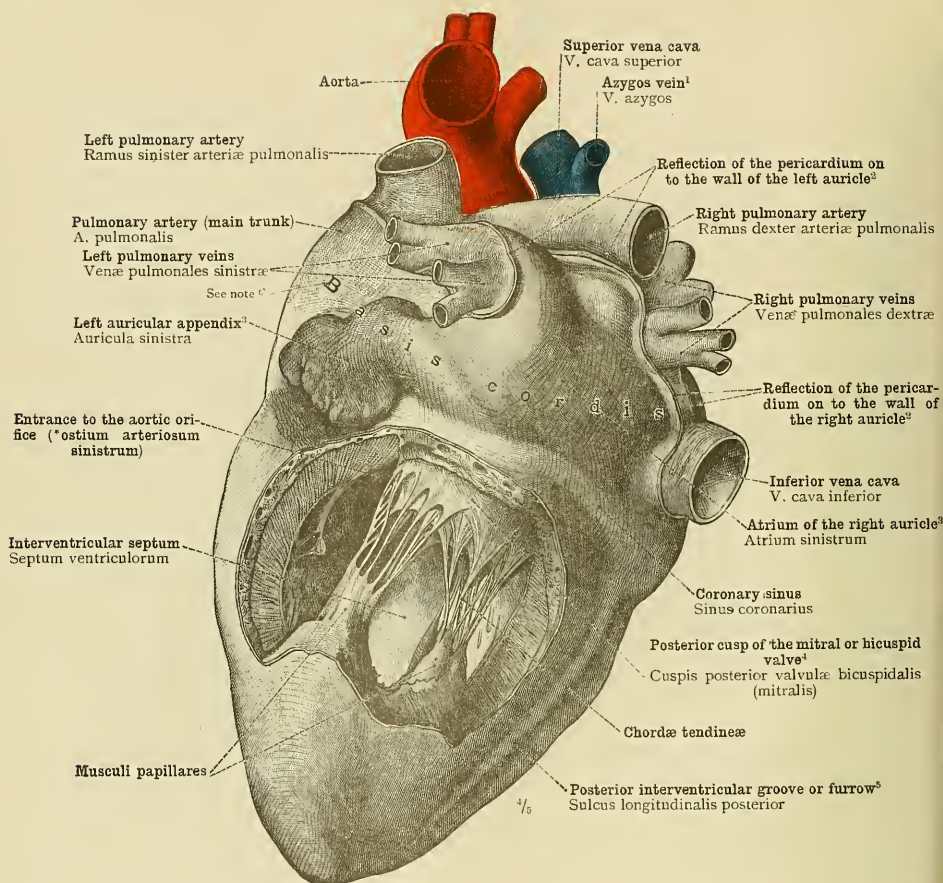


FIG. 948.—THE HEART SEEN FROM THE LEFT SIDE AND BELOW.

In the left ventricle, ventriculus sinister, which has been opened by the removal of a portion of its posterior wall, the mitral or bicuspid valve, valvula bicuspidalis (mitralis), the two musculi papillares, and the chordæ tendineæ of the latter, are displayed. At the base of the heart the reflection of the parietal pericardium to form the visceral pericardium of the auricles is seen (see notes ¹ and ² to p. 565). The preparation is the same as that shown in Fig. 946.

¹ Sometimes called the *right* or *large azygos vein*.

² Or junction of the *parietal* with the *visceral pericardium* (epicardium); see also note ² to page 565.

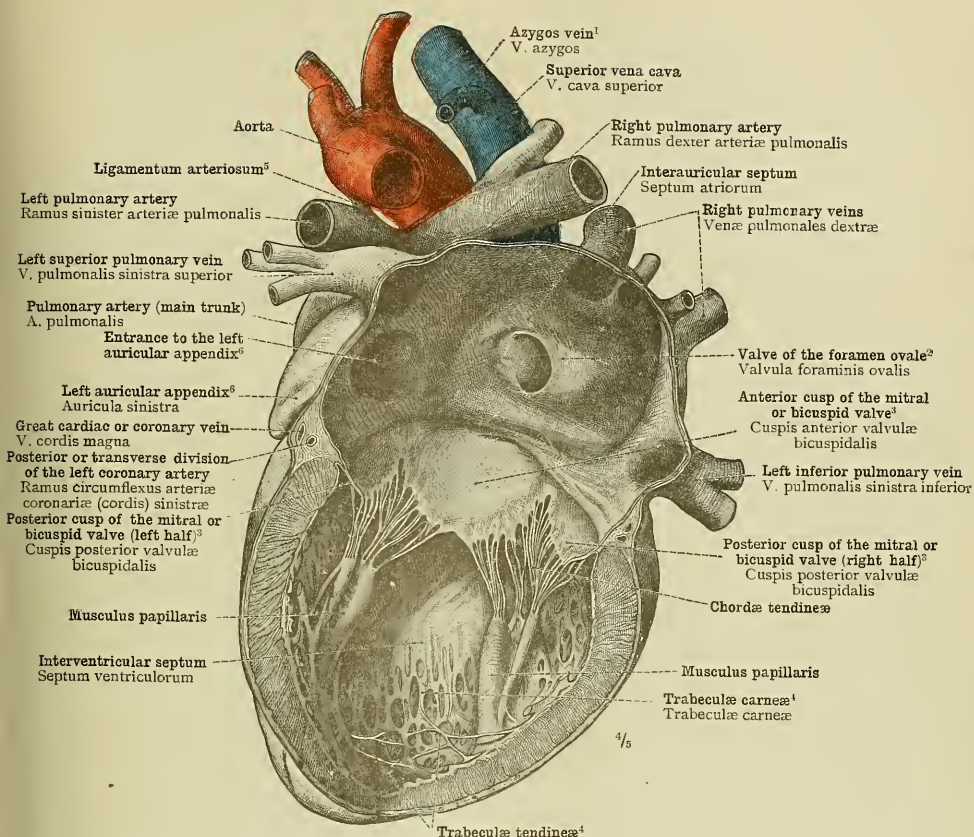
³ See Appendix, note 125.

⁴ *Mitral or Bicuspid Valve*.—The *cusps* or *flaps* of this valve are named *anterior* and *posterior* respectively, but do not lie exactly in front and behind one another in coronal planes. The *anterior* flap, which is the larger of the two, is to the right as well as in front, between the mitral and the aortic orifices (hence it is sometimes named the *aortic* flap of the mitral valve); the *posterior* and smaller flap lies to the left of as well as behind the other, and close to the wall of the ventricle. At each side of the orifice, in the angles of junction of the large flaps, are small intermediate flaps.—Tr.

⁵ *Sulcus Longitudinalis*.—Strictly, this term, as used by the author, denotes, not only the interventricular groove or furrow (anterior or posterior, as the case may be), but in addition the much less strongly marked interauricular groove or furrow. In the text, however, I have translated the term *sulcus longitudinalis*, either as *inter-ventricular* or as *inter-auricular groove or furrow*, according as the ventricular or the auricular part of the "longitudinal sulcus" is indicated in the several figures.—Tr.

⁶ *Basis Cordis*, or *Corona Cordis*.—These terms are used by the author as alternative names for that portion of the heart (together with the intrapericardial extremities of the great vessels) that lies above and to the right of the auriculoventricular groove. In England, however, the term *base of the heart* has a different signification. (See also Appendix, note 118).—Tr.

Left ventricle—Ventriculus sinister.



¹ Called also the *right* or *large azygos vein*.

² Called by Macallister *valvula sinistra socii venosi*.

³ See note 4 to p. 356.

⁴ *Columnæ Carneæ*.—These muscular bands, projecting inwards from the walls into the cavities of the ventricles, are of two kinds: some are simply ridges, termed *pilasters*; others form bridges or beams, attached at their extremities but free in the middle, known as *trabeculæ*. Some of the trabeculæ, near the apex of the heart, are tendinous throughout the extent of their free parts, and these are distinguished as *trabeculæ tendinæ* from the more numerous, *trabeculæ carneæ*, which are fleshy throughout.—Ta.

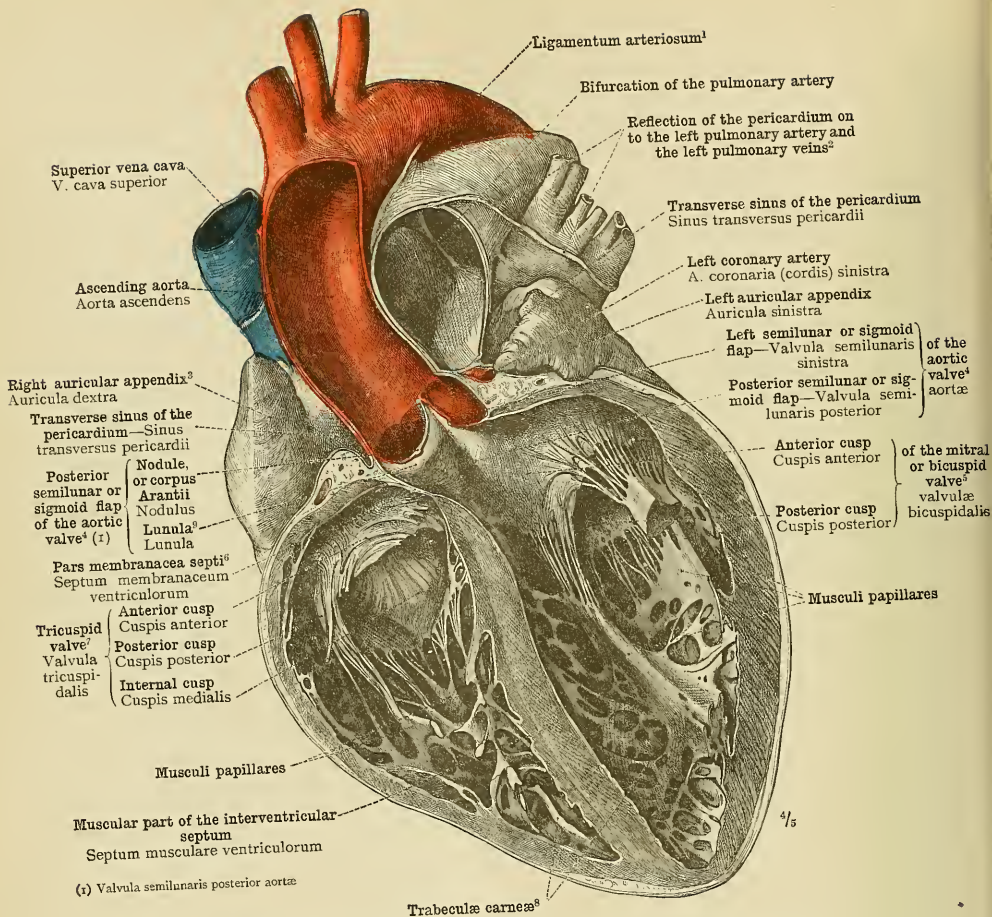
⁵ See Appendix, note III.

⁶ See Appendix, note III.

FIG. 949.—THE HEART SEEN FROM THE LEFT SIDE.

The left ventricle and the left auricle have been opened by an incision passing upwards from the apex of the heart to the space between the auricular orifices of the left pulmonary veins, and through the upper wall of the left auricle to the space between the auricular orifices of the right pulmonary veins, and the lateral walls of the cavities have been drawn outwards. In the left ventricle, ventriculus sinister, we see the divided posterior flap, cuspid posterior, and the intact anterior or aortic flap, cuspid anterior, of the mitral or bicuspid valve; also the anterior and posterior papillary muscles, musculi papillares, with their chordæ tendinæ; also the interventricular septum, septum ventriculorum, the trabeculæ carneæ, and, near the apex, a few free tendinous trabeculæ, trabeculæ tendinæ. In the left auricle we see the orifices of the four pulmonary veins, venæ pulmonales; the interauricular septum, septum atriorum, with its membranous portion, representing the valve of the foramen ovale, and the entrance to the left auricular appendix.

Left auricle—Atrium sinistrum.—Left ventricle—Ventriculus sinister.



1 See Appendix, note 111.

2 Or junction of the parietal and visceral pericardium. (See also note 2 to p. 565).—Tr.

3 See Appendix, note 113.

4 See note 2 to p. 564.

5 See note 4 to p. 566.

6 The membranous part of the interventricular septum is sometimes spoken of as the undivided space.—Tr.

7 See note 5 to p. 564.

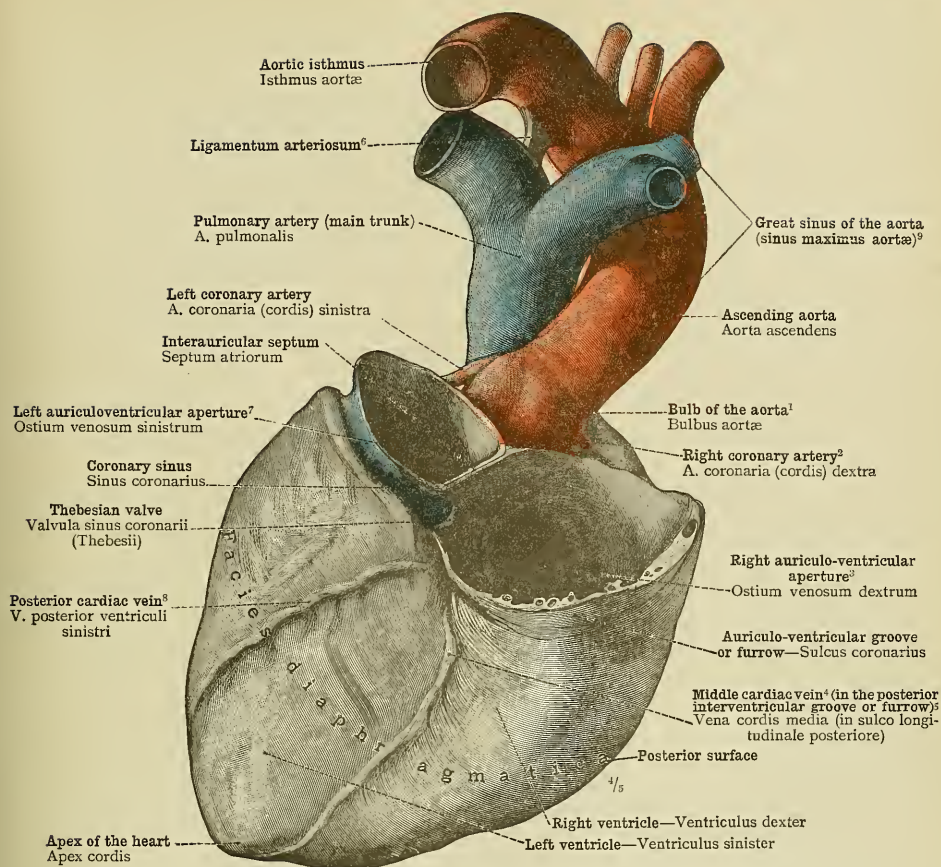
8 See note 4 to p. 567.

9 See note 7 to p. 564.

FIG. 950.—THE HEART SEEN FROM BEFORE.

The organ having been hardened in formalin in the distended state (*i.e.*, in diastole), the anterior portion of the "cone of the heart" (*i.e.*, the anterior portion of both ventricles—see Appendix, note 118), the anterior half of the ascending aorta, and the main trunk of the pulmonary artery nearly as far as the bifurcation, were removed by a coronal section. In the opened "cone of the heart, we see the interventricular septum, at the top of which is the pars membranacea septi, or undefined space (septum membranaceum ventriculorum); all the cusps of the mitral and tricuspid valves; and also the musculi papillares with their chordae tendineae. Of the auricles, the right and the left auricular appendages are visible; and between these and the aorta, on the right, and the main trunk of the pulmonary artery, on the left, the entrances to the transverse sinus of the pericardium. In the aortic orifice (ostium arteriosum sinistrum), the posterior semilunar or sigmoid flap of the aortic valve (see note 2 to p. 564), with its nodule, or corpus Arantii, and its two lunulae (see note 1 to p. 564), is preserved intact. On the anterior surface of the left pulmonary veins, the left pulmonary artery, and the superior vena cava, we see the reflection of the serous layer of the pericardium into the epicardium (see notes 1 and 2 to p. 565).

The Ventricles of the Heart and the Interventricular Septum.



¹ *Bulb of the Aorta*.—This name is often given to the somewhat enlarged portion of the ascending aorta immediately above the aortic valve, which contains the three sinuses of *Valvula*.—T.E.

² See Appendix, note 114. ³ Or *tricuspid orifice*.

⁴ See note 5 to p. 566. ⁵ See Appendix, note 111.

⁶ Called by Macalister the *left marginal vein*.

⁷ Called by Macalister the *posterior interventricular vein*.

⁸ Or *mitral orifice*.

⁹ See Appendix, note 126.

FIG. 951.—THE POSTERIOR SURFACE, FACIES DIAPHRAGMATICA, OF THE *CONE OF THE HEART (*i.e.*, THE VENTRICULAR PORTION OF THE HEART—see Appendix, note 113), WITH THE MAIN TRUNK OF THE PULMONARY ARTERY AND ITS BIFURCATION, THE ASCENDING AORTA, AND THE ARCH OF THE AORTA. THE BULB OF THE AORTA, BULBUS AORTÆ; THE ORIGIN OF THE CORONARY ARTERIES, RIGHT AND LEFT, ARTERIÆ CORONARIÆ (CORDIS), DEXTRA ET SINISTRA. THE LIGAMENTUM ARTERIOSUM, OR LIGAMENT OF BOTALLO, AND THE AORTIC ISTHMUS, ISTHMUS AORTÆ.

The heart having been hardened in the distended state (*i.e.*, in diastole), the auricles were removed by a section passing immediately above the auriculoventricular groove or furrow (sulcus coronarius), and the coronary sinus was thus laid open as far as the terminal orifice through which it communicates with the right auricle.

The Ventricular Portion of the Heart with the Aorta and the Pulmonary Artery.

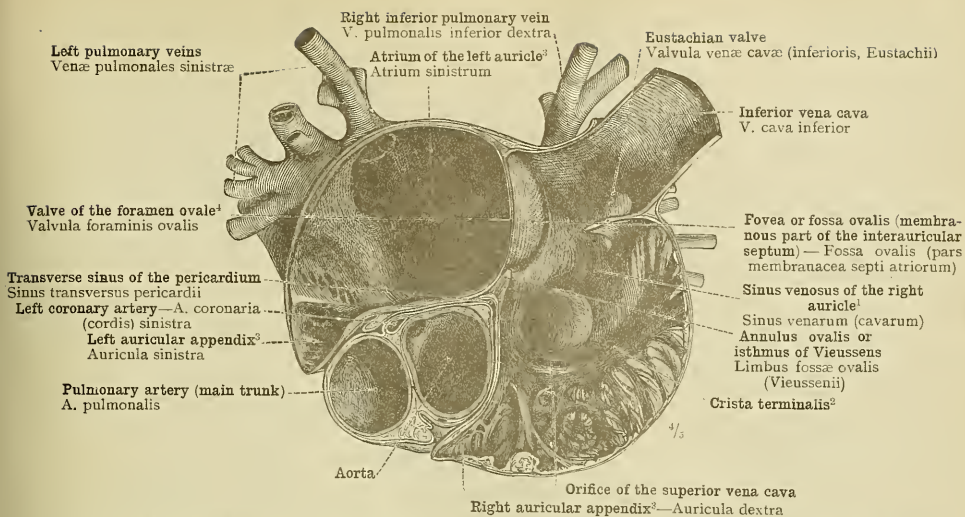


FIG. 954.—SINUS TRANSVERSUS PERICARDII, THE TRANSVERSE SINUS OF THE PERICARDIUM. MUSCULI PECTINATI AND CRISTA TERMINALIS OF THE RIGHT AURICLE². SINUS VENOSUS³. THE MEMBRANOUS PART OF THE INTERAURICULAR SEPTUM.

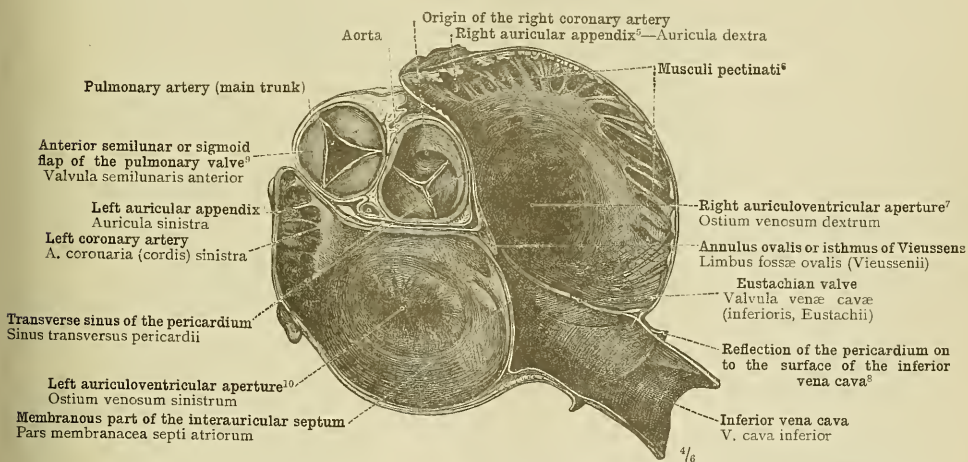


FIG. 955.—THE SEMILUNAR OR SIGMOID FLAPS OF THE AORTIC AND PULMONARY VALVES, WITH THEIR NODULES, OR CORPORA ARANTII (NODULI VALVULARUM SEMILUNARUM). THE MEMBRANOUS PART OF THE INTERAURICULAR SEPTUM AND THE EUSTACHIAN VALVE.

The auricular portion of the heart was removed by a section passing through both auricular appendices, through the root of the aorta and of the pulmonary artery, and hemisecting the orifice and the proximal portion of the inferior vena cava. In Fig. 954 the upper segment, and in Fig. 955 the lower segment, of the heart is shown.

¹ See Appendix, note 115.

² *Crista Terminalis*.—This forms the boundary between the smooth wall of the *sinus venosus* (see Appendix, note 115) and the fasciculated wall of the rest of the auricle. The fasciculi themselves are called *musculi pectinati*. The inward projection of the *crista terminalis* (called by Macalister *tenia terminalis*) corresponds to the *sulcus terminalis* seen on the outside of the wall of the auricle (see Fig. 945, p. 563).

³ See Appendix, note 113.

⁴ See Appendix, note 113.

⁵ Or junction of the *parietal* and *visceral pericardium*—see note ² to p. 565.

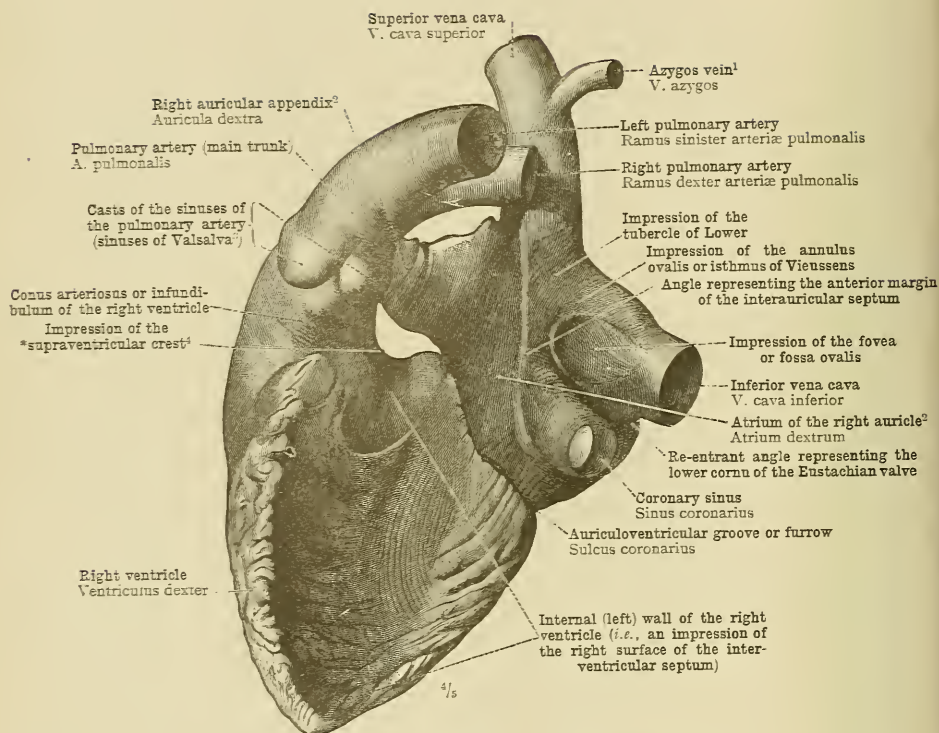
⁶ Called by Macalister *valvula sinistra sacci venosi*.

⁷ See note ² above.

⁸ Or *mitral orifice*.

⁹ Or *tricuspid orifice*.

¹⁰ See note ² to p. 564.



¹ Called also the *right or large azygos vein*.

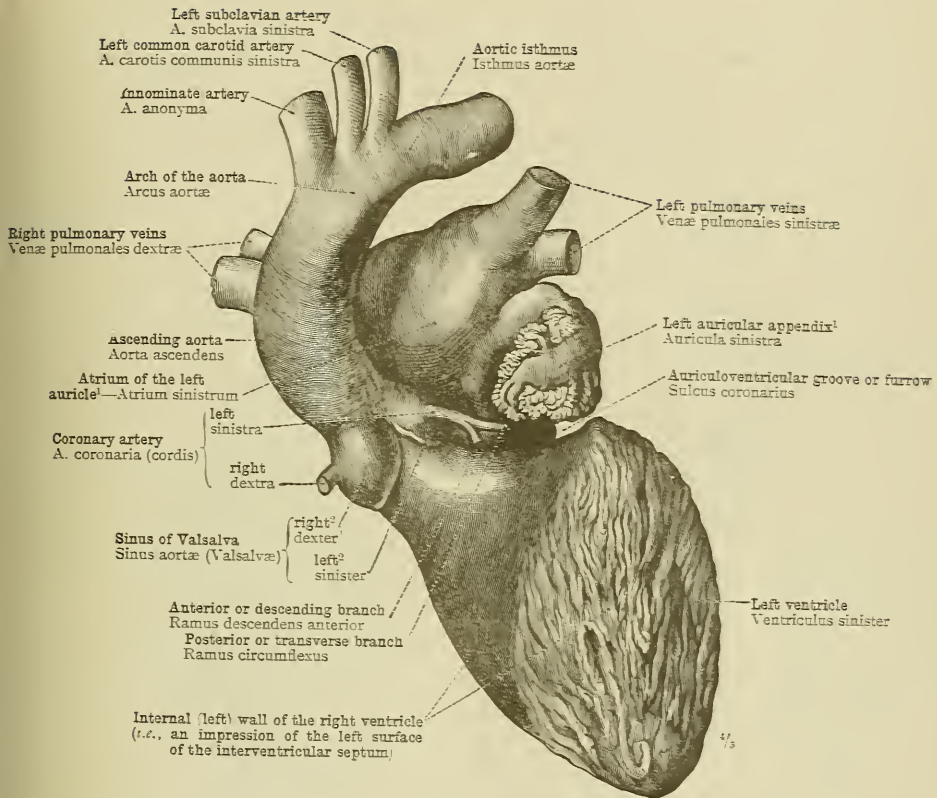
² See Appendix, note 113.

³ See Appendix, note 112.

⁴ See note 4 to p. 564.

FIG. 956.—CAST OF THE INTERIOR OF THE RIGHT SIDE OF THE HEART, WITH THE MAIN TRUNK AND THE BIFURCATION OF THE PULMONARY ARTERY, THE PROXIMAL EXTREMITIES OF THE SUPERIOR AND INFERIOR VENÆ CAVÆ, AND THE CORONARY SINUS, SEEN FROM THE INNER SIDE.

The Configuration of the Right Side of the Heart.



¹ See Appendix, note 173.

² Regarding the position and nomenclature of the several sinuses of Valsalva, the same considerations apply as regarding the several semilunar or sigmoid flaps of the aortic valve—see note ² to p. 564.—*Ed.*

³ Called by Macalister the *anterior interventricular artery*.

FIG. 957.—CAST OF THE INTERIOR OF THE LEFT SIDE OF THE HEART, WITH THE AORTA TO A POINT A LITTLE BEYOND THE ISTHMUS, THE COMMENCEMENT OF THE CORONARY ARTERIES, AND THE PROXIMAL EXTREMITIES OF THE SUPERIOR AND INFERIOR VENE CAVÆ, SEEN FROM THE INNER SIDE.

The Configuration of the Left Side of the Heart.

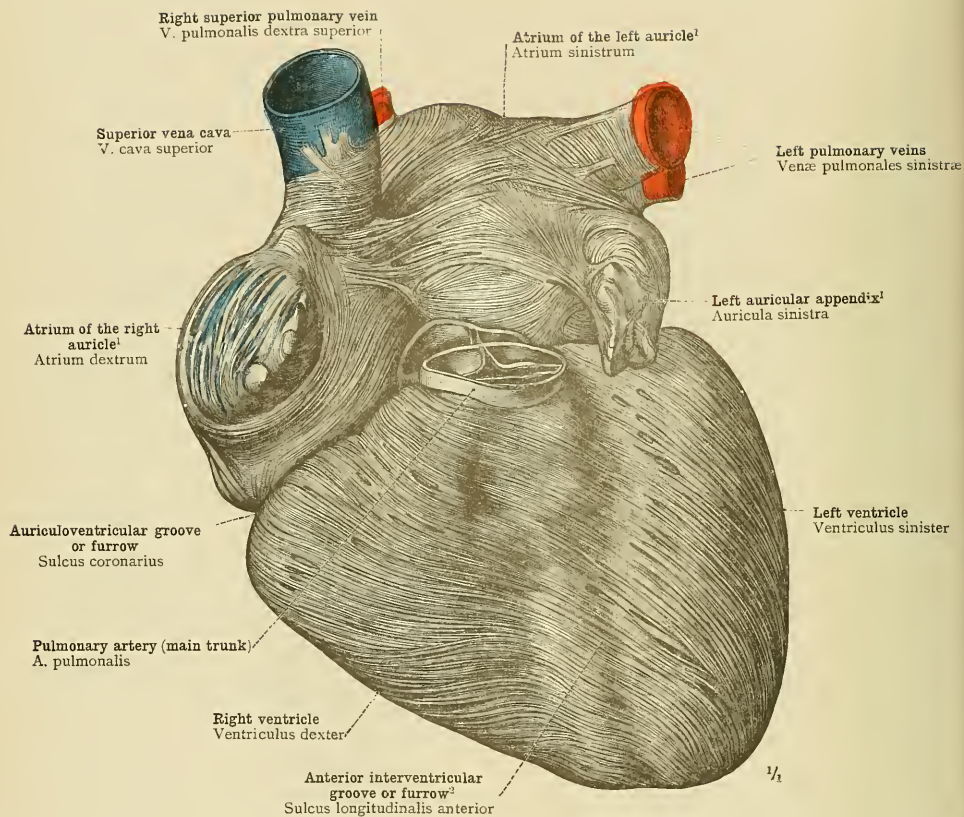
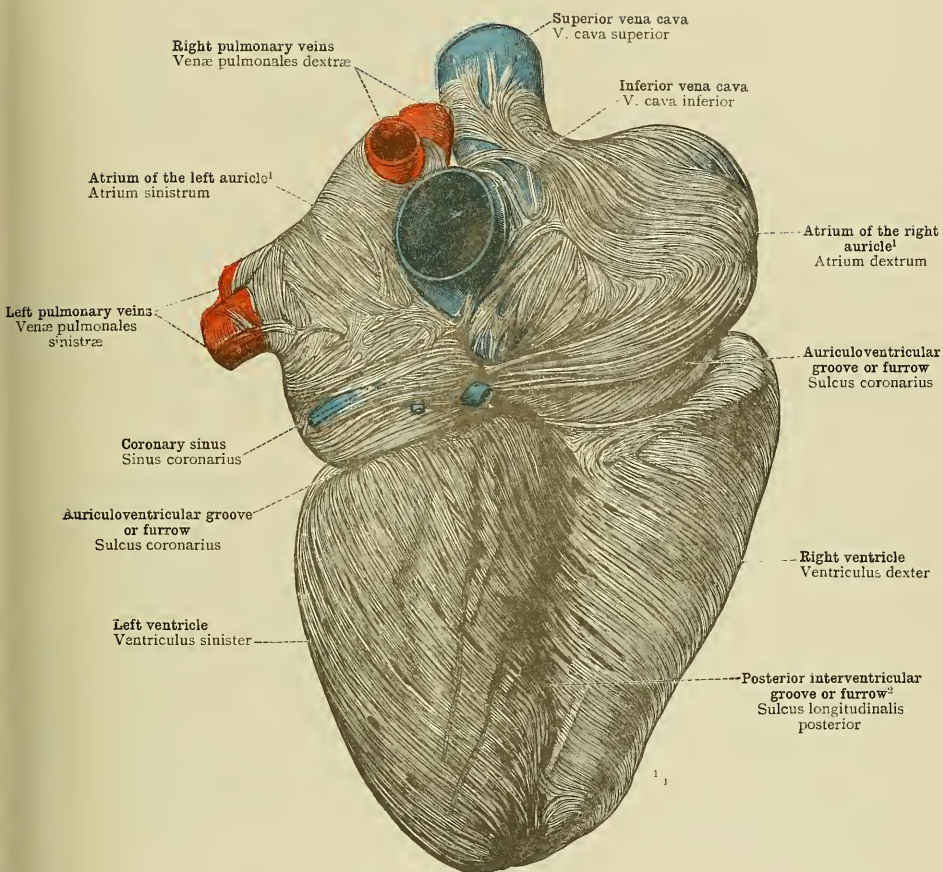
¹ See Appendix, note ¹¹³.² See note 5 to p. 566.

FIG. 958.—SUPERFICIAL FIBRES OF THE MYOCARDIUM ON THE ANTERIOR SURFACE OF THE VENTRICLES AND AURICLES.

The heart was injected with tallow prior to dissection.



¹ See Appendix, note 123.

² See note 5 to p. 566.

FIG. 959.—SUPERFICIAL FIBRES OF THE MYOCARDIUM ON THE POSTERIOR SURFACE OF THE VENTRICLES AND AURICLES.

The preparation shown in Fig. 958, seen from behind.

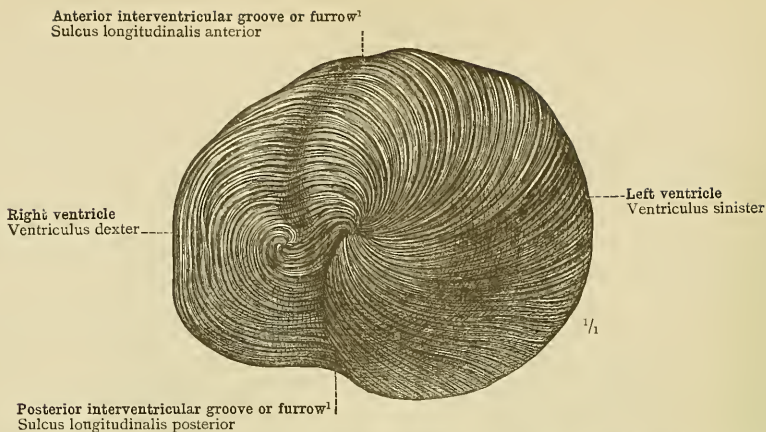


FIG. 960.—VORTEX OR WHORL OF THE HEART, VORTEX CORDIS, AT THE APEX OF THE *CONE OF THE HEART (*i.e.*, OF THE VENTRICULAR PORTION OF THE HEART—see note ¹² to p. 563); SEEN FROM BELOW.

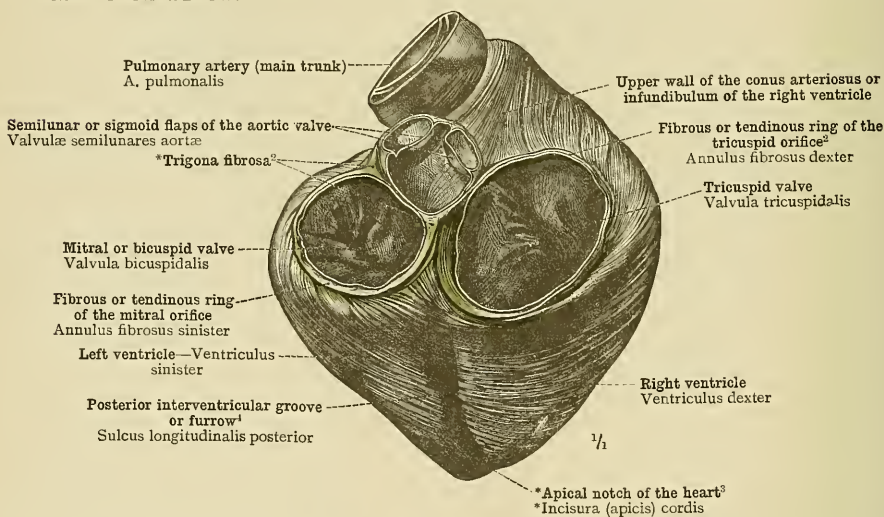


FIG. 961.—THE *CONE OF THE HEART (*i.e.*, THE VENTRICULAR PORTION OF THE HEART—see note ¹² to p. 563) SEEN FROM ABOVE AND BEHIND, WITH THE SUPERFICIAL FIBRES OF THE MYOCARDIUM LAID BARE; THE FIBROUS OR TENDINOUS RINGS OF THE AURICULOVENTRICULAR APERTURES, ANNULI FIBROSI, AND THE *TRIGONA FIBROSA.²

¹ See note 5 to p. 566.

² *Annuli Fibrosi* and **Trigona Fibrosa*.—The *fibrous or tendinous rings* of the auriculoventricular apertures are by Macalister called *zone tendinosa*. Connected with these are the **trigona fibrosa* (the term is not used by English anatomists). These are strong triangular masses of fibrocartilage. The *right *trigonum fibrosum*, situated in the angle between the aortic and the two auriculoventricular openings, corresponds to the *os cordis* of certain mammals, such as the ox. The *left *trigonum fibrosum* lies in front of the mitral orifice, in the angle between that orifice and the left side of the aortic orifice.—Tr.

³ See note 5 to p. 565.

⁴ See note 5 to p. 566.

Vortex cordis—Vortex or whorl of the heart.—Annuli fibrosi—Fibrous or tendinous rings of the auriculoventricular apertures.

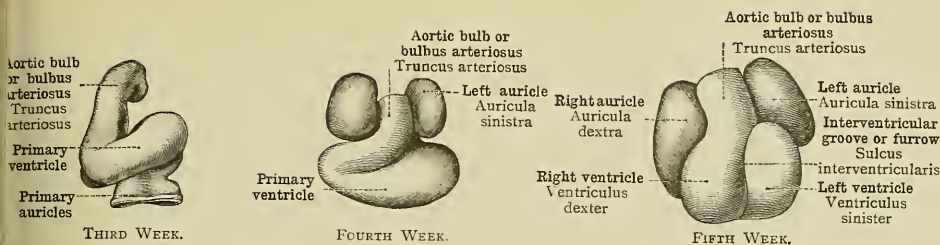


FIG. 962.—STAGES IN THE DEVELOPMENT OF THE HUMAN HEART IN THE FIRST WEEKS OF INTRA-UTERINE LIFE. (ENLARGED. AFTER W. HIS.)

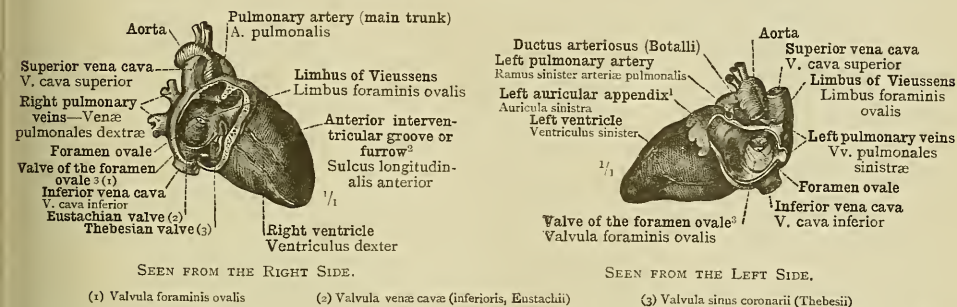


FIG. 963.—FORAMEN OVALE SEPTI ATRIORUM, THE FORAMEN OVALE OF THE INTERAURICULAR SEPTUM, AS SEEN IN THE HEART OF A HUMAN FŒTUS AT THE END OF THE SIXTH MONTH (MONTHS OF FOUR WEEKS EACH) WHEN THE FREE (OUTER) WALLS OF BOTH AURICLES HAVE BEEN REMOVED.

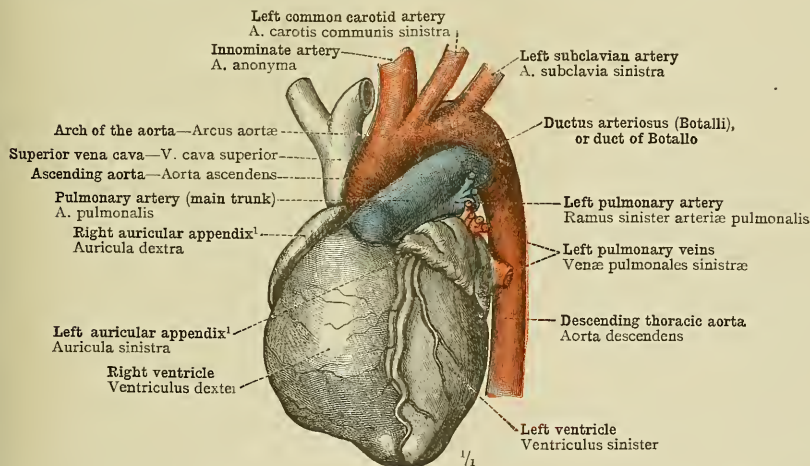


FIG. 964.—THE HEART (INJECTED) OF AN INFANT BORN AT FULL TERM, SEEN FROM THE LEFT SIDE AND BEFORE. The ductus arteriosus or duct of Botallo is seen to be directly continuous with the main trunk of the pulmonary artery.

¹ See Appendix, note 113.

² Called by Macalister *valvula sinistra sacci venosi*.

³ See note 5 to p. 566.

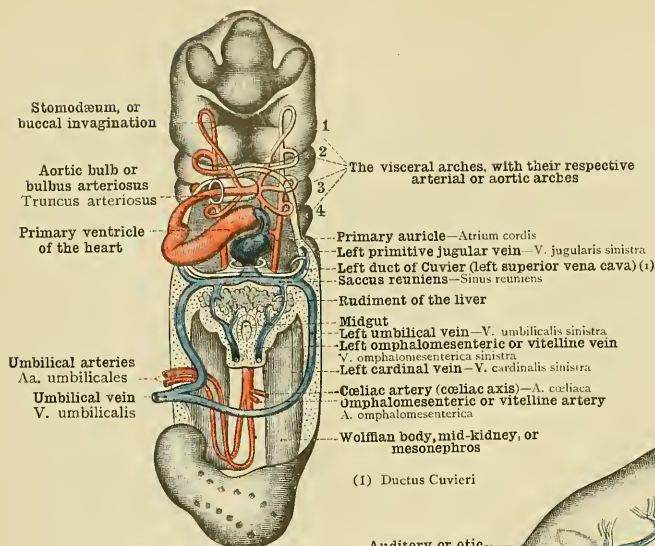


FIG. 965.—THE VASCULAR SYSTEM IN A HUMAN EMBRYO OF ABOUT EIGHTEEN TO TWENTY DAYS, HAVING A BODY-LENGTH OF $\frac{1}{10}$ INCH (2.6 MILLIMETRES), SEEN FROM BEFORE. (COMPILED FROM TWO DRAWINGS BY W. HIS.)

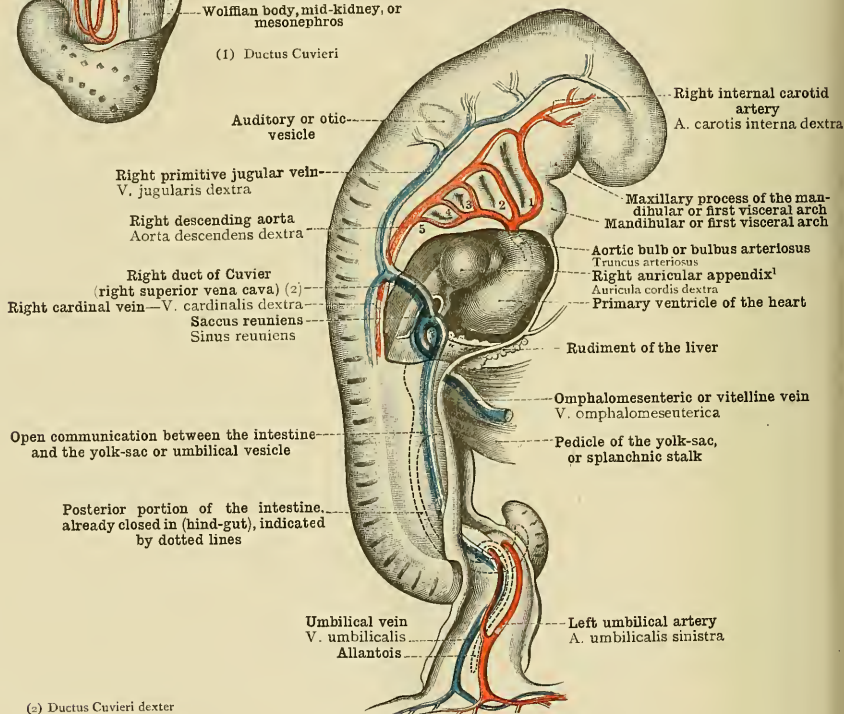


FIG. 966.—CONDITION OF THE HEART AND VASCULAR SYSTEM IN A HUMAN EMBRYO OF THE TWENTY-SECOND OR TWENTY-THIRD DAY, HAVING A BODY-LENGTH OF $\frac{1}{8}$ INCH (4.2 MILLIMETRES), SEEN FROM THE RIGHT SIDE. (AFTER W. HIS.)

The Vascular System at the End of the Third and in the Beginning of the Fourth Week of Intra-uterine Life.

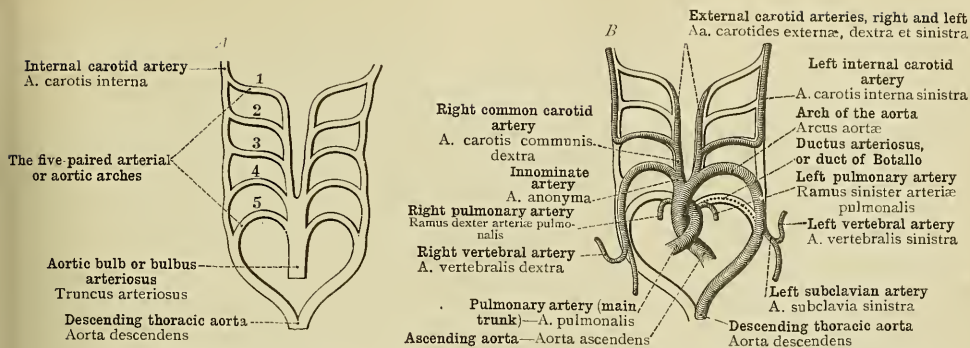


FIG. 967.—DIAGRAMMATIC REPRESENTATION OF THE TRANSFORMATION OF THE ARTERIAL OR AORTIC ARCHES. *A*, THEIR ORIGINAL ARRANGEMENT. *B*, THEIR SUBSEQUENT TRANSFORMATION INTO THE PERMANENT ARTERIAL TRUNKS. (AFTER RATHKE, WITH A SLIGHT MODIFICATION BY F. HOCHSTETTER.)

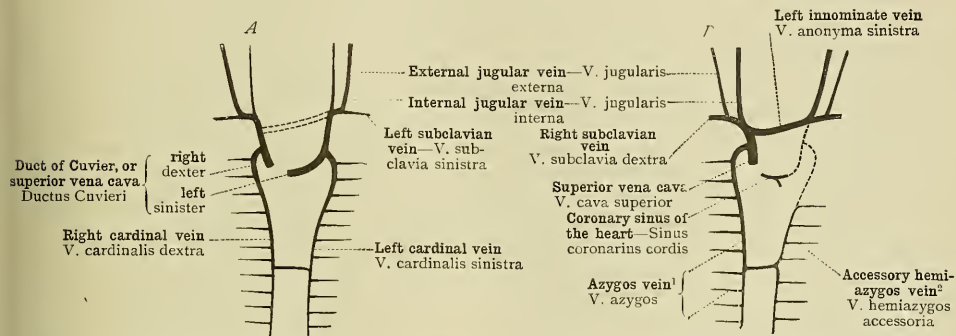


FIG. 968.—DIAGRAMMATIC REPRESENTATION OF THE RUDIMENTARY ARRANGEMENT OF THE SYSTEMIC SYSTEM OF VEINS (*A*), AND OF THE TRANSFORMATION OF THE SYSTEM OF THE SUPERIOR VENA CAVA (*B*). (AFTER RATHKE, WITH MODIFICATIONS BY F. HOCHSTETTER.)

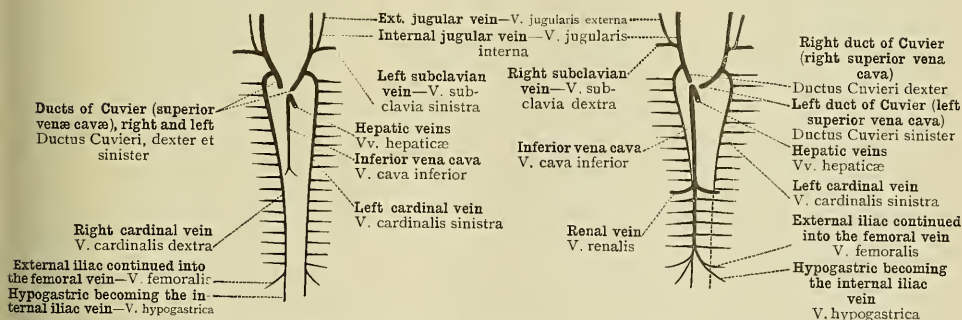
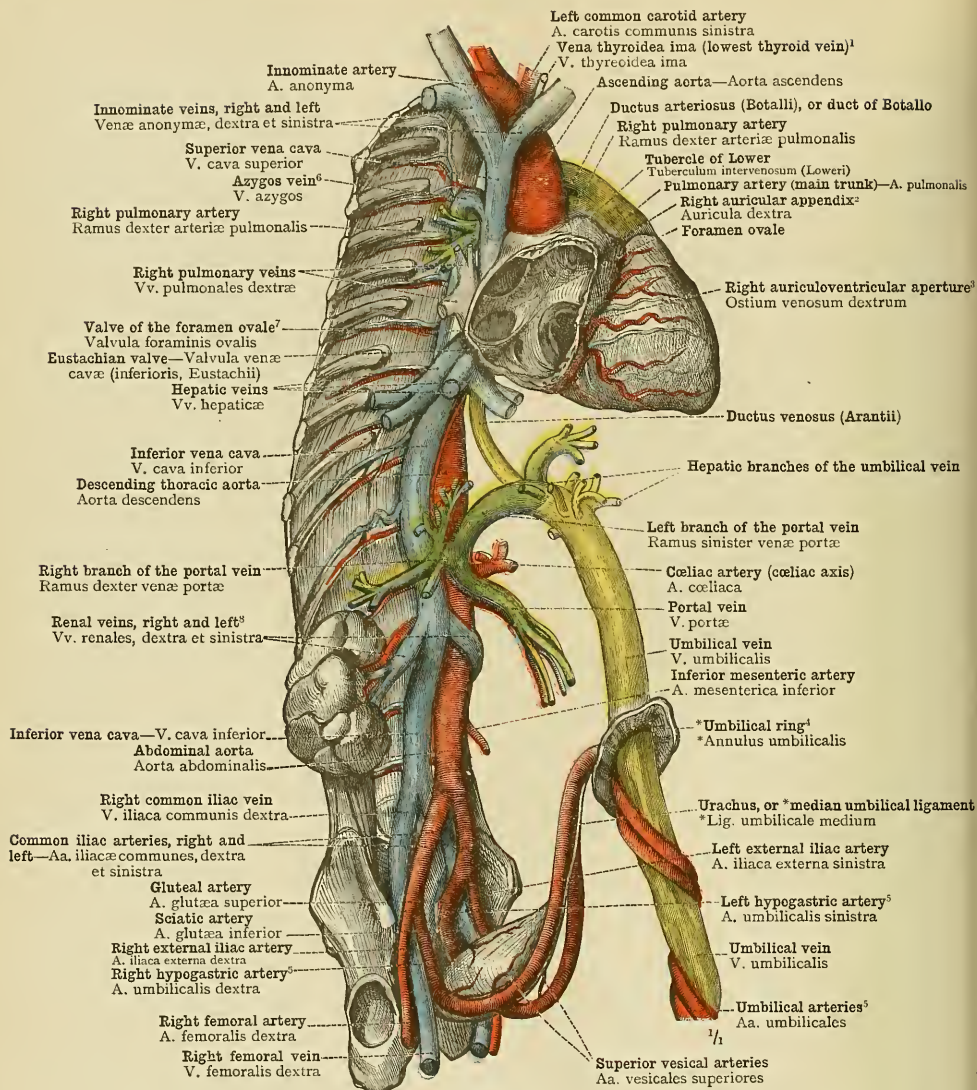


FIG. 969.—DIAGRAMMATIC REPRESENTATION OF THE DEVELOPMENT OF THE INFERIOR VENA CAVA. (AFTER RATHKE, IMPROVED BY F. HOCHSTETTER.)

¹ Called also the right or large azygos vein.

² Called also the left upper azygos vein.

The Rudimentary Condition of the Arterial and Venous Systems, and the Transformations by which the Normal Adult Condition of these Systems is attained.



¹ Companion to the *thyroidea ima artery*—see note ¹ to p. 590.—Tr.

³ Or *tricuspid orifice*.

⁴ See Appendix, note 129.

⁵ Called also the *right or large azygos vein*.

⁶ Sometimes called the *emulgent veins*. See note 3 to p. 595.—Tr.

² See Appendix, note 123.

³ See Appendix, note 120.

⁴ Called by Macalister *valvula sinistra sacci venosi*.

FIG. 970.—THE CIRCULATORY APPARATUS OF THE FETUS, AS SEEN IN AN INFANT STILL-BORN AT FULL TERM. VIEWED FROM THE RIGHT SIDE.

The right wall of the right auricle has been removed, to show the foramen ovale and its valve, and also the Eustachian valve. The umbilical vein with its hepatic branches and the ductus venosus (Arantii) are coloured yellow; the portal vein, the pulmonary arteries, and the ductus arteriosus (Botalli), are coloured green.

The Fœtal Circulatory Apparatus.

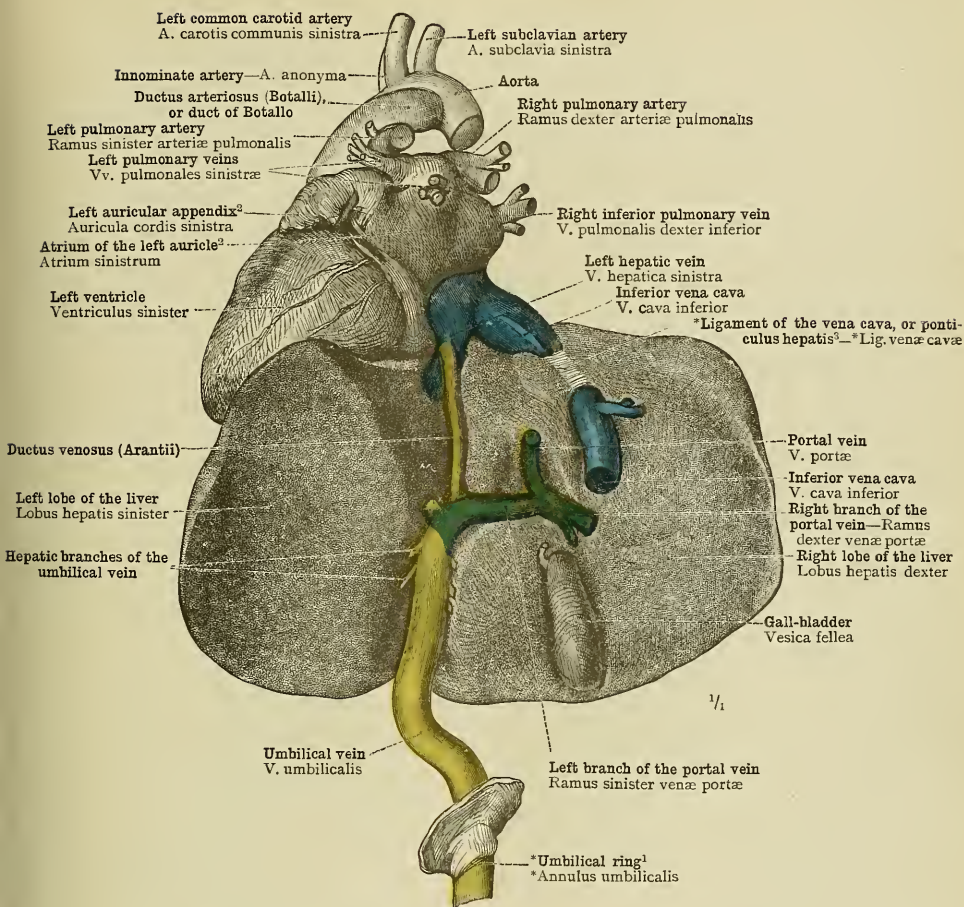
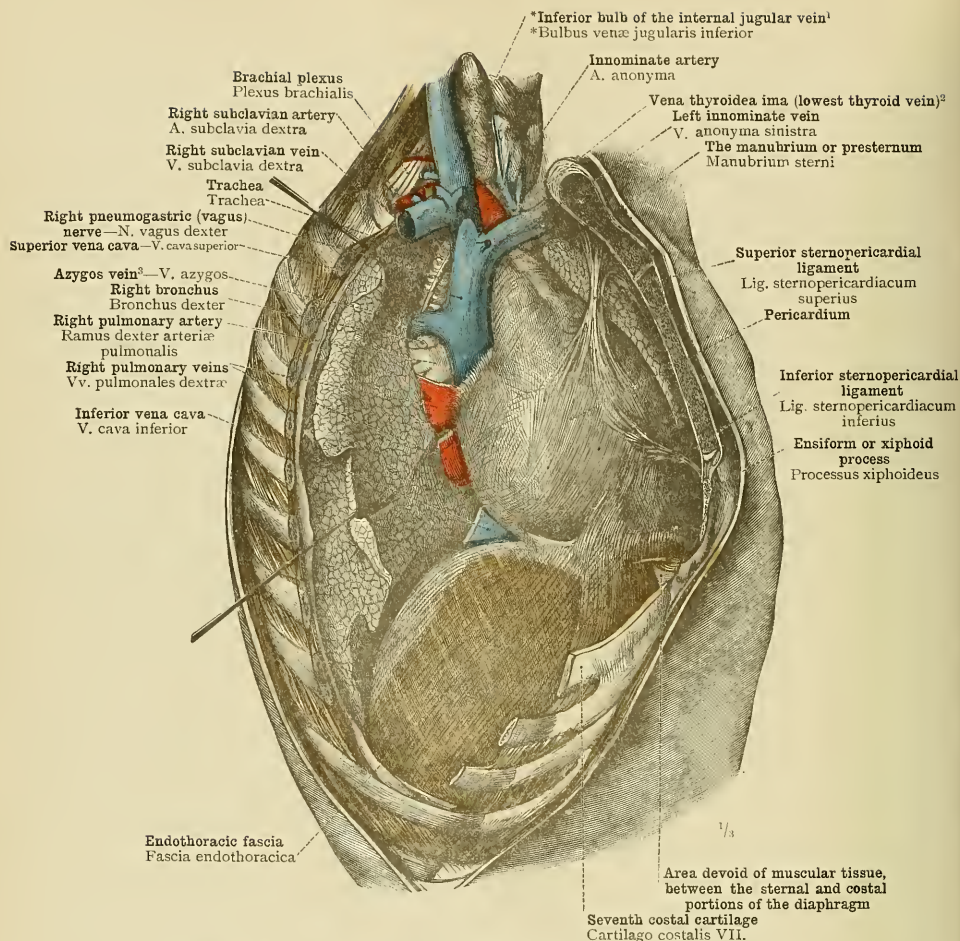
¹ See Appendix note ¹¹⁹.² See Appendix, note ¹¹³.³ See Appendix, to Part IV., note ¹⁷.

FIG. 971.—THE LIVER AND THE HEART OF AN INFANT STILL-BORN AT FULL TERM. THE UMBILICAL VEIN, VENA UMBILICALIS, FROM THE *UMBILICAL RING (see Appendix, note ¹¹⁹) TO ITS TERMINATION IN THE LEFT BRANCH OF THE PORTAL VEIN, AND THE HEPATIC BRANCHES GIVEN OFF FROM THE UMBILICAL VEIN IN THE UMBILICAL FISSURE OF THE LIVER; THE DIVISION OF THE PORTAL VEIN, VENA PORTÆ, INTO ITS RIGHT AND LEFT BRANCHES; THE ORIGIN OF THE DUCTUS VENOSUS (ARANTII) IN THE LEFT BRANCH OF THE PORTAL VEIN, AND ITS TERMINATION IN THE LEFT HEPATIC VEIN.

The liver is represented as seen from below; the heart, as seen from behind. The short remaining portion of the trunk of the portal vein has been turned upwards.



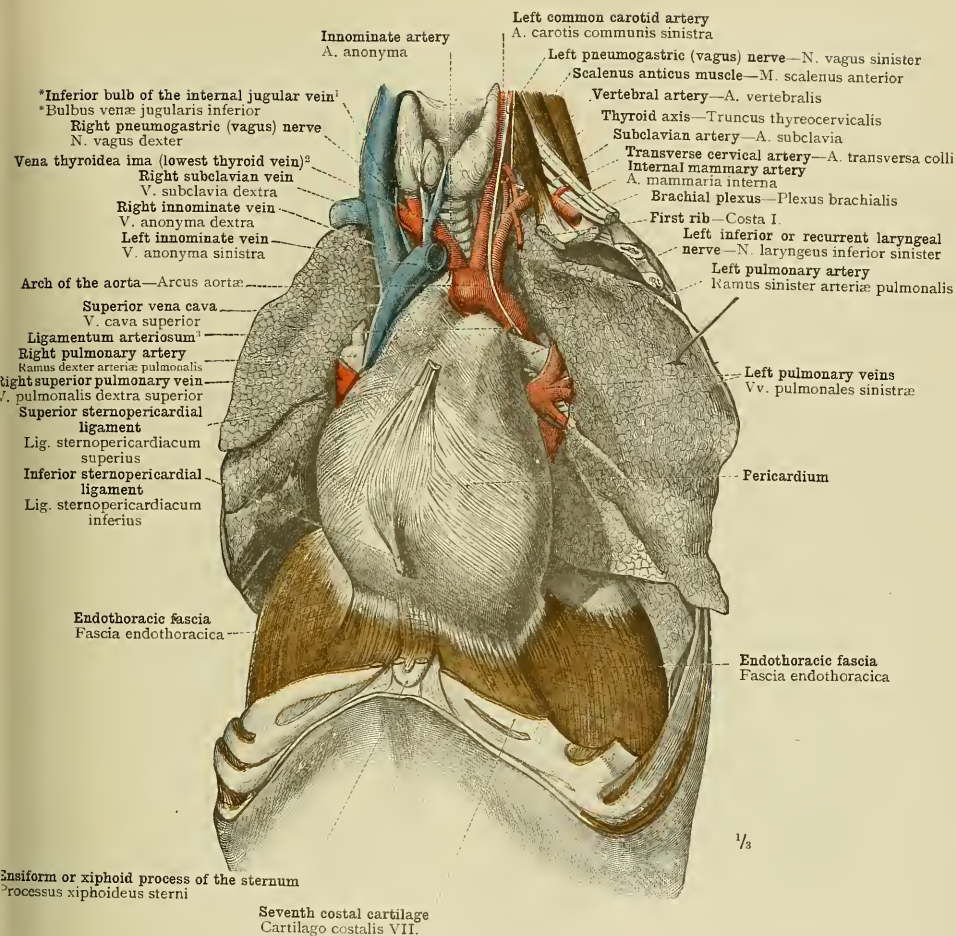
¹ See Appendix, note 121.

² Companion to the *thyroidea ima artery*—see note ¹ to p. 590.—Tr.
³ Called also the *right or large azygos vein*.

FIG. 972.—POSITION AND RELATIONS OF THE PERICARDIUM; ITS CONNEXIONS WITH THE ENDOTHORACIC FASCIA AND WITH THE DIAPHRAGM. PROLONGATION OF THE FIBROUS LAYER OF THE PERICARDIUM TO FORM TUBULAR INVESTMENTS FOR THE AORTA, THE SUPERIOR VENA CAVA, AND THE RIGHT PULMONARY VEINS. THE SUPERIOR AND INFERIOR STERNOPERICARDIAL LIGAMENTS. SEEN FROM THE RIGHT SIDE AND BEFORE.

The sternum having been divided sagittally in the median plane, its left half was drawn a little forwards; the right wall of the thorax was removed as far down as the tenth rib; and the right lung was drawn backwards as far as possible, in order to display the vessels forming its root.

The Pericardium.—The Sternopericardial Ligaments.



Ensiform or xiphoid process of the sternum
Processus xiphoideus sterni

Seventh costal cartilage
Cartilago costalis VII.

¹ See Appendix, note ¹²¹.

² Companion to the *thyroidea ima* artery—see note ¹ to p. 590.—Tr.

³ See Appendix, note ¹¹⁴.

FIG. 973.—POSITION AND RELATIONS OF THE PERICARDIUM; ITS CONNEXIONS WITH THE ENDOTHORACIC FASCIA AND WITH THE DIAPHRAGM; PROLONGATION OF ITS FIBROUS LAYER TO FORM TUBULAR INVESTMENTS FOR THE ARCH OF THE AORTA, THE LEFT PULMONARY ARTERY, AND THE LEFT PULMONARY VEINS. ON THE ANTERIOR WALL OF THE PERICARDIUM, THE REMAINS OF THE STERNOPERICARDIAL LIGAMENTS, WHICH HAVE BEEN DIVIDED, ARE VISIBLE. SEEN FROM THE LEFT SIDE AND BEFORE.

In the preparation shown in Fig. 972, the left wall of the thorax was removed to the same extent as the right wall had already been cut away, and both lungs were drawn backwards as far as possible, in order to display the vessels of the roots of the lungs.

The Pericardium.—The Sternopericardial Ligaments.

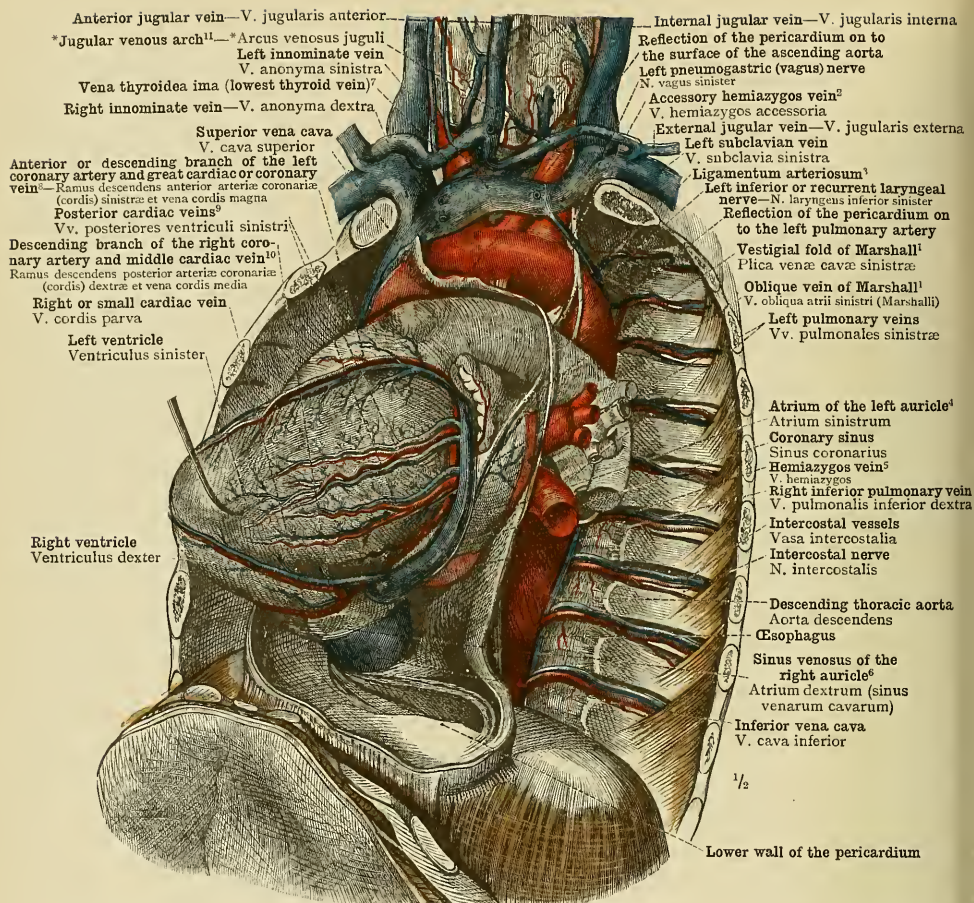
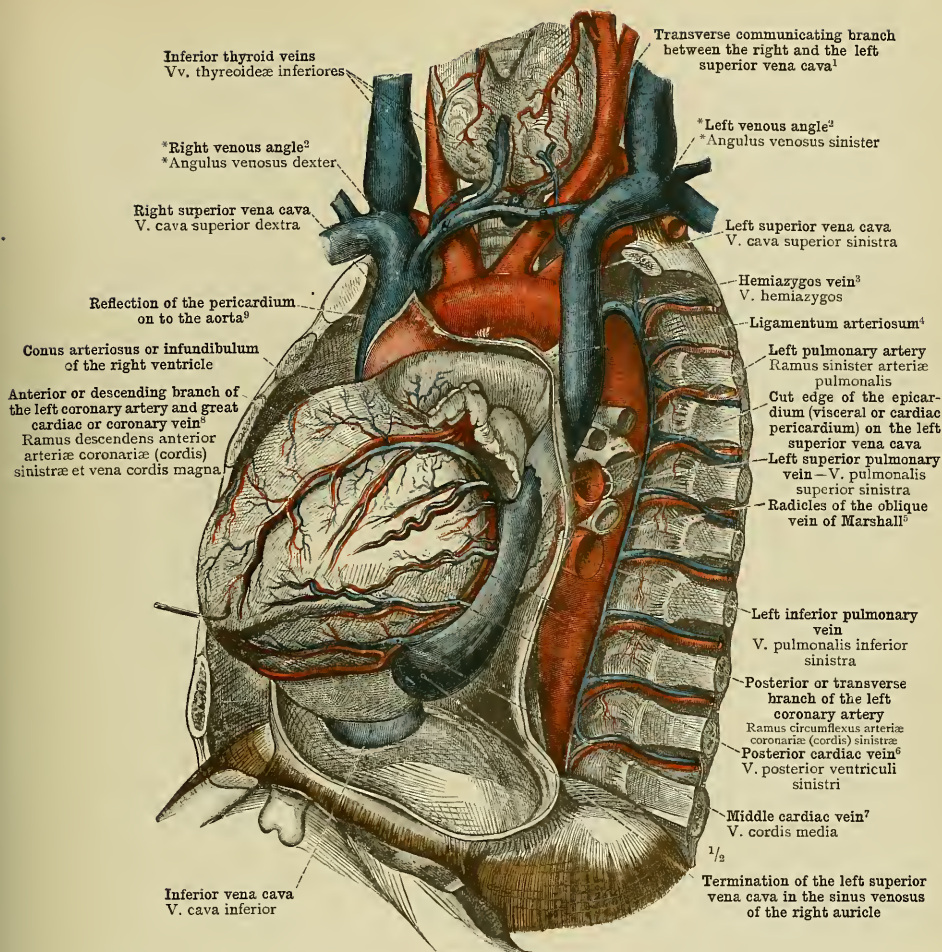
¹ See Appendix, note 122.⁴ See Appendix, note 113.⁷ Companion to the thyroidea ima artery—see note ⁴ to p. 590.—Tr.⁸ Called by Macalister the anterior interventricular artery and vein.¹⁰ Called by Macalister the posterior interventricular artery and vein.² Called also the left upper azygos vein.⁵ Known also as the left lower or small azygos vein.³ See Appendix, note 111.⁶ See Appendix, note 115.⁹ Called by Macalister the left marginal veins.¹¹ See Appendix, note 113.

FIG. 974.—THE VESTIGIAL FOLD (PLICA VENÆ CAVÆ SINISTRÆ—see Appendix, note 122), AND ITS RELATION TO THE OBLIQUE VEIN OF MARSHALL (VENA OBLIQUA ATRII SINISTRI MARSHALLI—see Appendix, note 115). SEEN FROM BEFORE, BELOW, AND THE LEFT SIDE.

The sternum having been removed and the greater part of the left lateral wall of the thorax having been cut away, the front and the left side of the pericardium were removed by incisions passing along the attachments of the membrane to the great vessels and to the diaphragm. The heart was drawn upwards and to the right, in order to display its posterior surface (facies diaphragmatica). The coronary vessels were dissected out by partial removal of the epicardium (visceral or cardiac pericardium).

Pericardium, Epicardium, Vestigial Fold, Cardiac Veins.



¹ See Appendix, note 124.

² See Appendix, note 125.

³ This represents the combined upper and lower left azygos veins of the normal body.—Tr.

⁴ See Appendix, note 117.

⁵ *Vena Obliqua Atrii Sinistri (Marshalli)*. See Appendix, note 127.

⁶ Called by Macalister the left marginal vein.

⁷ Called by Macalister the posterior interventricular vein.

⁸ Called by Macalister the anterior interventricular artery and vein.

⁹ Or junction of the parietal and visceral pericardium. (See also note 2 to p. 565.)—Tr.

FIG. 975.—PERSISTENT LEFT SUPERIOR VENA CAVA (VENA CAVA SUPERIOR SINISTRA), AND ITS RELATIONS TO THE CARDIAC VEINS. SEEN FROM BEFORE, BELOW, AND THE LEFT SIDE.

The hemiazygos vein (see note 3 above) opens from behind into the left superior vena cava at the level of the body of the fourth dorsal vertebra. The comparatively slender transverse communicating branch between the right and the left superior vena cava, from which, after the obliteration of the proximal portion of the left superior vena cava, the transverse portion of the left innominate should in the natural course of development have been formed, receives, in addition to others, the inferior thyroid veins.

The thoracic cavity and the pericardium have been opened, and the heart has been drawn upwards and to the right, as in the preparation shown in Fig. 974. By the partial removal of the epicardium (visceral or cardiac pericardium), the left superior vena cava was laid bare in its course along the back of the left auricle and in the auriculo-ventricular groove, up to its termination in the sinus venosus of the right auricle; and its tributary veins and the branches of the coronary arteries were also dissected out.

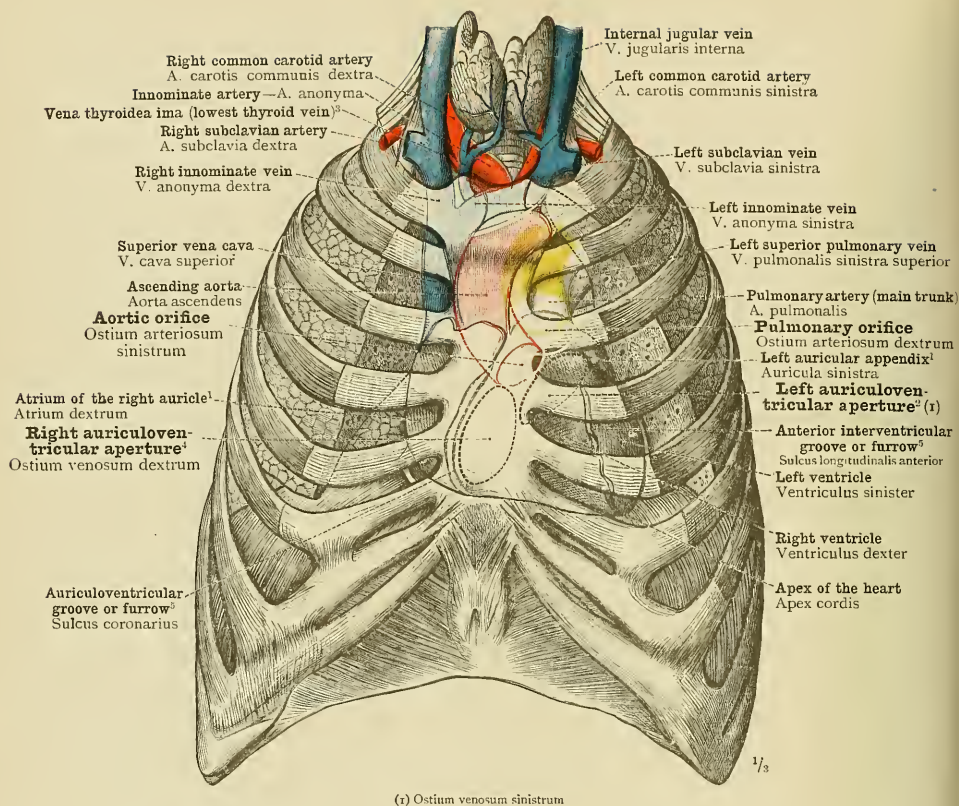
¹ See Appendix, note 113.³ Companion to the *thyroidea ima artery*—see note ¹ to p. 590.—Tr.⁵ See note 5 to p. 566.² Or *mitral orifice*.⁴ Or *tricuspid orifice*.

FIG. 976.—POSITION OF THE HEART AND THE GREAT VESSELS AND OF THE CARDIAC ORIFICES, AND THE PROJECTION-OUTLINES OF THESE STRUCTURES ON THE ANTERIOR WALL OF THE THORAX.

After preliminary hardening with formalin, the pericardium was exposed in the intercostal spaces.

The sternum was then sawn across horizontally at the level of the second and the sixth intercostal spaces, and was removed with a sufficient extent of the attached ribs and rib-cartilages to lay the heart fully bare. The excised portion of the wall of the thorax having been replaced in its position, the preparation was then photographed, first with, and then without, the excised segment, and the projection-outline of the heart was thus determined. By means of suitable incisions, the position and extent of the respective orifices was determined, as well as their projection-outlines upon the anterior surface of the heart. The cartilage of the eighth rib is in this specimen directly attached to the sternum; and the innominate and the left common carotid artery arise from the aorta by a common trunk.

Position and Projection-Outlines of the Heart, the Cardiac Orifices, and the Great Vessels.

ARTERIA PULMONALIS
THE PULMONARY ARTERY

ARTERIÆ TRUNCI
THE ARTERIES OF THE TRUNK

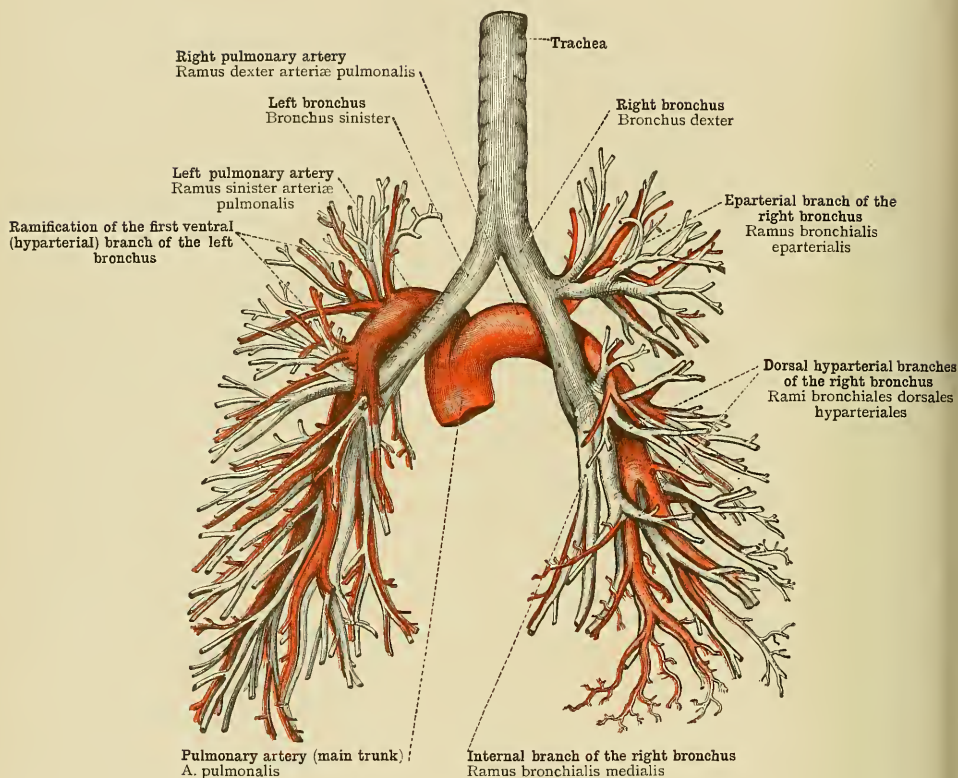


FIG. 977.—THE MAIN TRUNK OF THE PULMONARY ARTERY, ARTERIA PULMONALIS; ITS BIFURCATION INTO THE RIGHT AND THE LEFT PULMONARY ARTERY, RAMUS DEXTER ET RAMUS SINISTER ARTERIÆ PULMONALIS; THE RAMIFICATION OF THE PULMONARY ARTERIES WITHIN THE LUNG, AND THEIR RELATION TO THE BRONCHIAL RAMIFICATION. SEEN FROM BEHIND.

Arteria pulmonalis—The pulmonary artery.

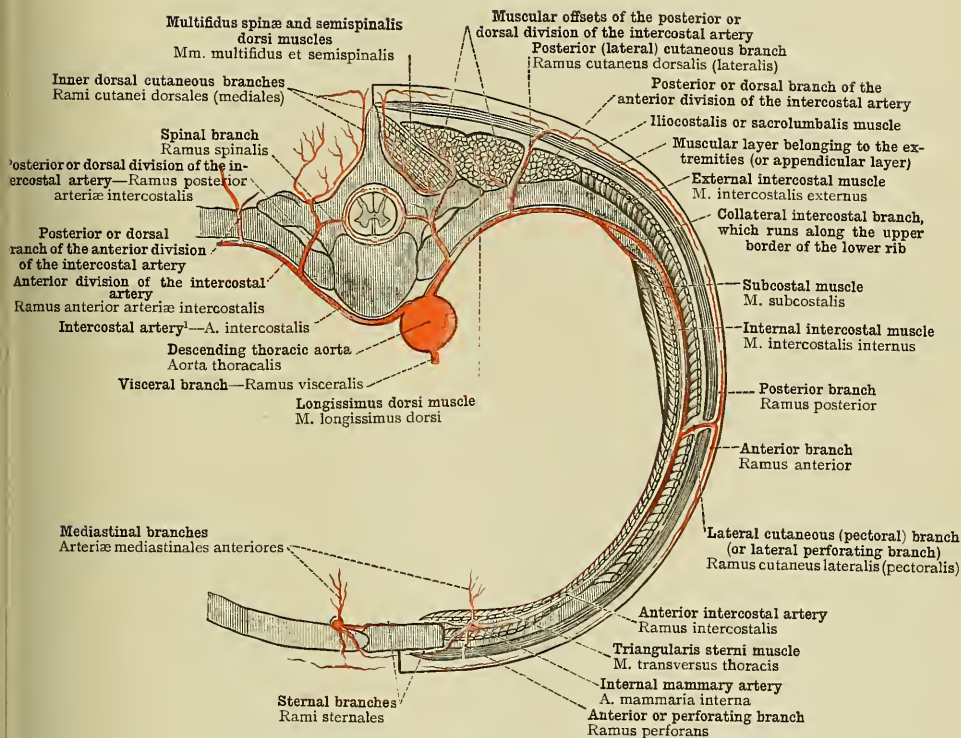
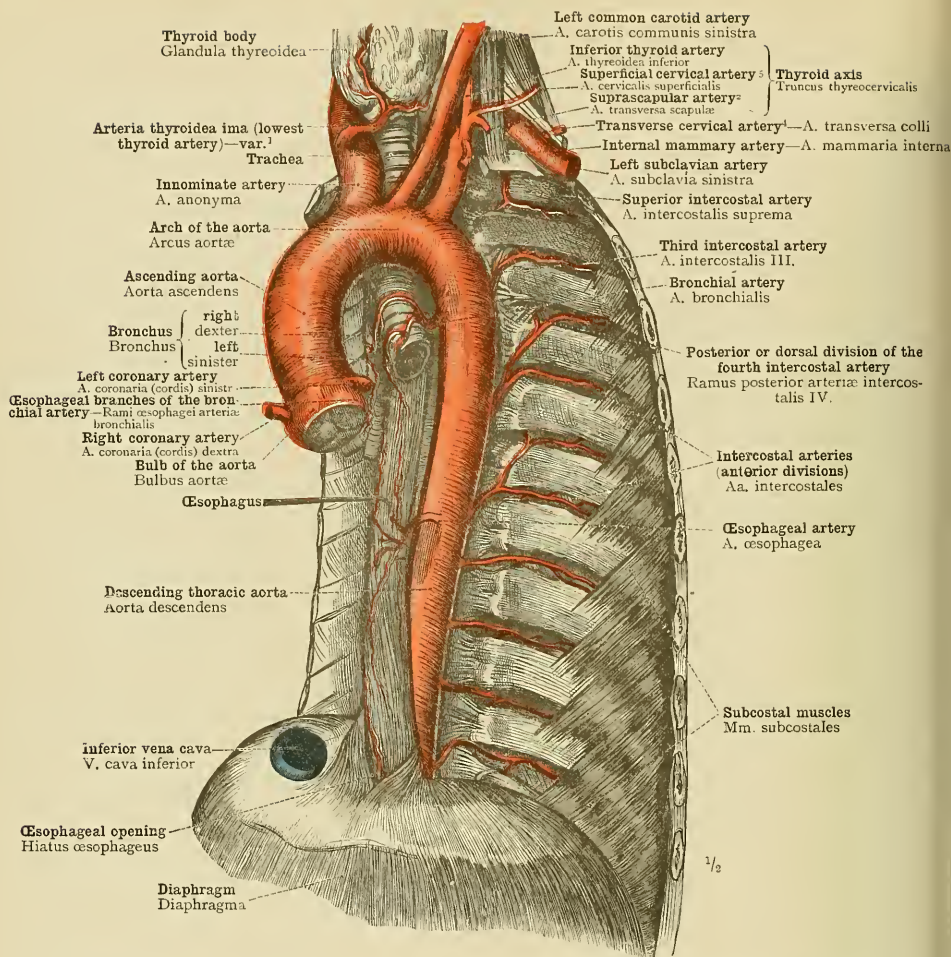


FIG. 978.—DIAGRAMMATIC REPRESENTATION OF THE DISTRIBUTION OF THE ARTERIES SUPPLYING THE BODY-WALL, SHOWN IN A THORACIC SEGMENT.¹

¹ *Intercostal Arteries*.—Quain's description of the distribution of these arteries differs somewhat from that given in the text. The main trunk of the intercostal artery runs along the lower border of the upper rib, and ends by anastomosing with one of the anterior intercostal branches of the internal mammary artery. Its branches are (1) *posterior or dorsal (ramus posterior)*, which gives *spinal, muscular, and cutaneous* offsets (*ramus spinalis, rami musculares, rami cutanei dorsales mediales*), (2) the *collateral intercostal branch*, which runs along the upper border of the lower rib, and ends by anastomosing with the lower of the two anterior intercostal arteries given to each space by the internal mammary artery. The *ramus dorsalis* of the anterior division is not described by Quain; the *ramus cutaneus lateralis (pectoralis)*, which accompanies the lateral cutaneous branch of the intercostal nerve, is named by that author only in the section on the "Morphology of the Arterial System," where it is shown to belong to the series of *lateral perforating arteries*.—Tr.



¹ *Arteria Thyroidea Ima (Lowest Thyroid Artery).*—This artery is met with on an average in one body in every ten. It may arise from the innominate trunk (most frequently), from the right common carotid, or from the aorta. In exceptional instances it springs from the internal mammary or from the subclavian artery. Its size is a very variable one, being related inversely to that of the other thyroid arteries. Lying in front of the trachea, this vessel, like the inferior thyroid vein, is endangered in the operation of tracheotomy.—Tr.

² Known also as the *transverse scapular or transverse humeral artery.*

³ Or *posterior scapular artery* (Macalister). See Appendix, notes 134, 135, 172.

⁴ See note ¹ to p. 569.

⁵ See Appendix, notes 134, 135, 172, 208.

FIG. 979.—AORTA THORACALIS, THE THORACIC AORTA (CONSISTING OF THE ASCENDING AORTA, THE ARCH OF THE AORTA, AND THE DESCENDING THORACIC AORTA), WITH ITS VISCERAL AND PARIETAL BRANCHES SEEN FROM THE LEFT SIDE AND BEFORE. BRONCHIAL ARTERIES, ARTERIÆ BRONCHIALES. ESOPHAGEAL ARTERIES, ARTERIÆ ESOPHAGEÆ. INTERCOSTAL ARTERIES, ARTERIÆ INTERCOSTALES. IN ALL THE LEFT INTERCOSTAL SPACES EXCEPT THE UPPERMOST, ARE EXPOSED AS FAR FORWARDS AS THE INTERNAL INTERCOSTAL AND SUBCOSTAL MUSCLES. THEIR DIVISION INTO ANTERIOR AND POSTERIOR BRANCHES (RAMI ANTERIORES ET POSTERIORES) IS SEEN, AND THE ORIGIN OF THE MUSCULAR BRANCHES (RAMI MUSCULARES) OF THE FORMER.

The specimen shows a frequent variety in the origin of the fourth and fifth and of the sixth and seventh intercostal arteries from common roots. The second intercostal artery consists of the distal portion of the superior intercostal artery (arteria intercostalis suprema), which arises from the costocervical axis (truncus costocervicalis—see Appendix, note 177). From the subclavian artery arises the abnormal lowest thyroid artery of Neubauer, arteria thyroidea ima (see note ¹ above).

Aorta thoracalis, the thoracic aorta.—Aa. bronchiales et œsophageæ, the bronchial and œsophageal arteries.—Aa. intercostales, the intercostal arteries.

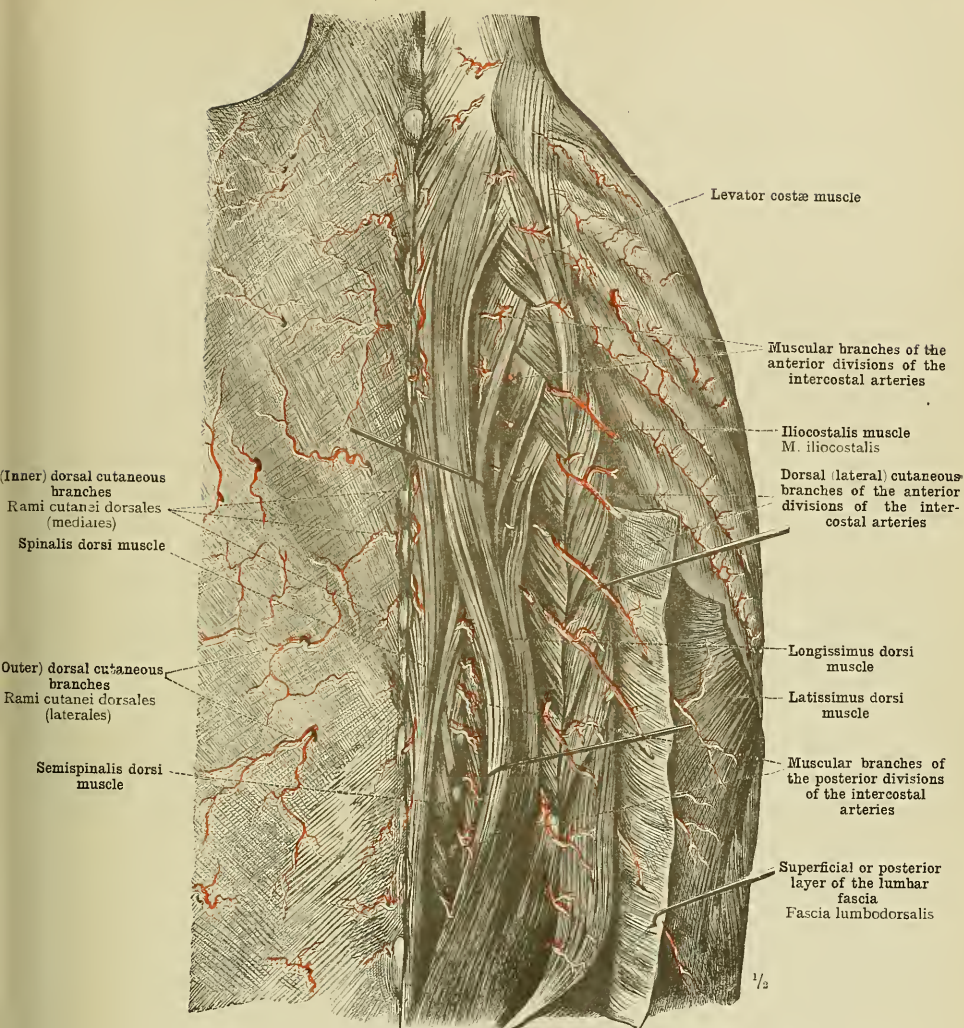


FIG. 980.—RAMIFICATION OF THE POSTERIOR OR DORSAL BRANCHES OF THE INTERCOSTAL ARTERIES IN THE BACK.

On the left side we see the inner and outer cutaneous branches; on the right side, chiefly the muscular branches. On the right side the superficial or posterior layer of the lumbar fascia (by some anatomists termed "the aponeurosis of the latissimus dorsi muscle"—see Part III., Fig. 507, p. 266, Fig. 508, p. 267, and note to the latter page) has been detached from the spinous processes and turned outwards; the iliocostalis muscle has been drawn outwards; and the longissimus dorsi muscle has been drawn outwards below, inwards above.

RAMI MUSCULARES ET RAMI CUTANEI DORSALES, MEDIALES ET LATERALES; THE INNER AND OUTER MUSCULAR AND CUTANEOUS POSTERIOR OR DORSAL BRANCHES OF THE INTERCOSTAL ARTERIES.

The outer row of branches is derived from the posterior or dorsal branches of the anterior divisions of the intercostal arteries, which divide between the longissimus dorsi and the iliocostalis muscles into inner and outer twigs.

Rami Posteriores, Posterior or Dorsal Branches, of the Intercostal Arteries.

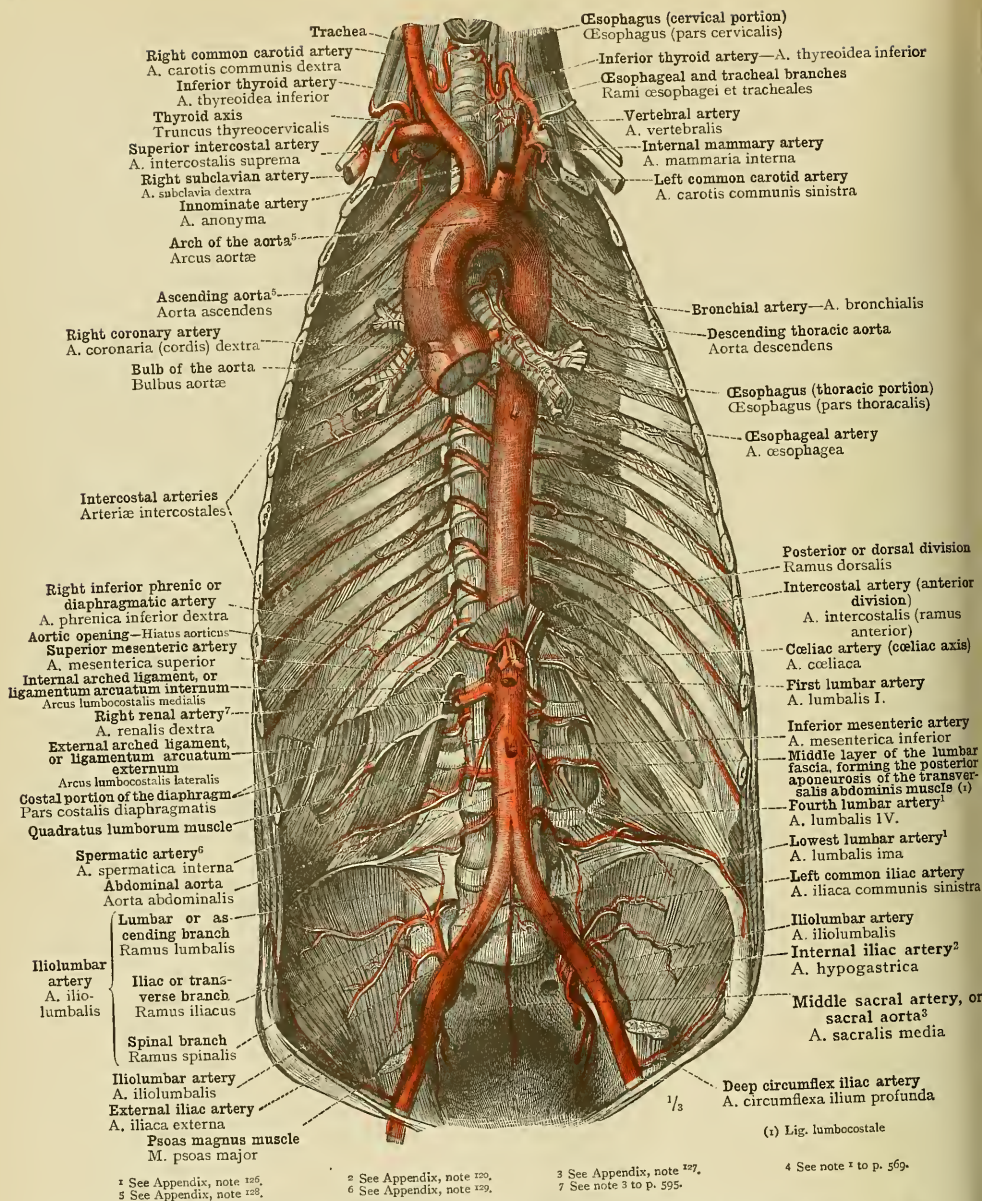
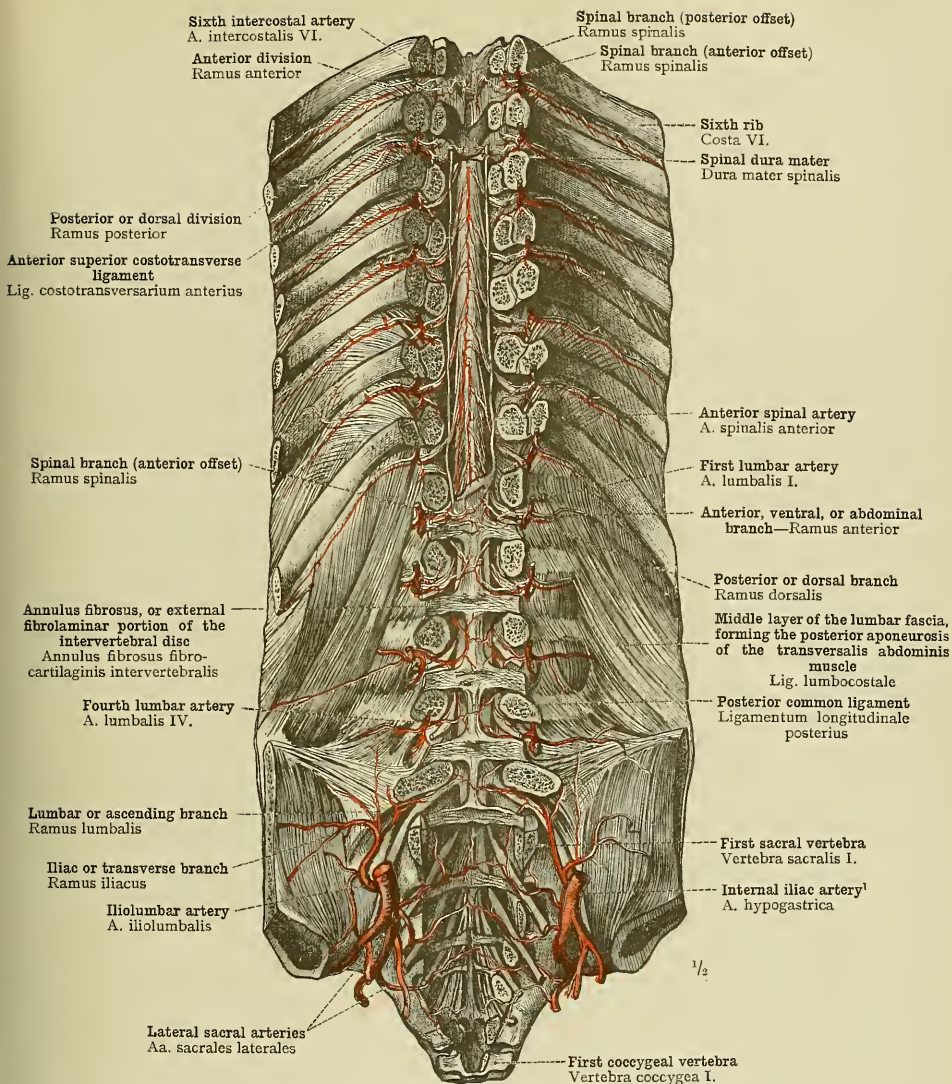


FIG. 981.—PARIETAL BRANCHES OF THE THORACIC AND ABDOMINAL AORTA: THE INTERCOSTAL ARTERIES, THE LUMBAR ARTERIES, AND THE MIDDLE SACRAL ARTERY, OR SACRAL AORTA.

The visceral branches of the aorta, with the exception of the bronchial artery, have been cut away close to their origin.

Arteriæ intercostales et lumbales—The intercostal and lumbar arteries.



¹ See Appendix, note 120.

FIG. 982.—RAMI SPINALES, THE SPINAL BRANCHES, OF THE INTERCOSTAL, LUMBAR, AND LATERAL SACRAL ARTERIES (ARTERIE INTERCOSTALES, LUMBALES, ET SACRALES LATERALES), SEEN FROM BEFORE.

The spinal canal and the intervertebral foramina have been opened by the removal of the vertebral bodies or centra. Down to the eighth dorsal vertebra, the spinal cord and the dura mater have been removed; from the eighth dorsal to the first lumbar vertebra, the spinal cord has been laid bare by the removal of the dura mater; below the first lumbar vertebra the posterior common ligament and the hindmost portions of the intervertebral discs have been left intact.

The Arteries of the Spinal Canal.

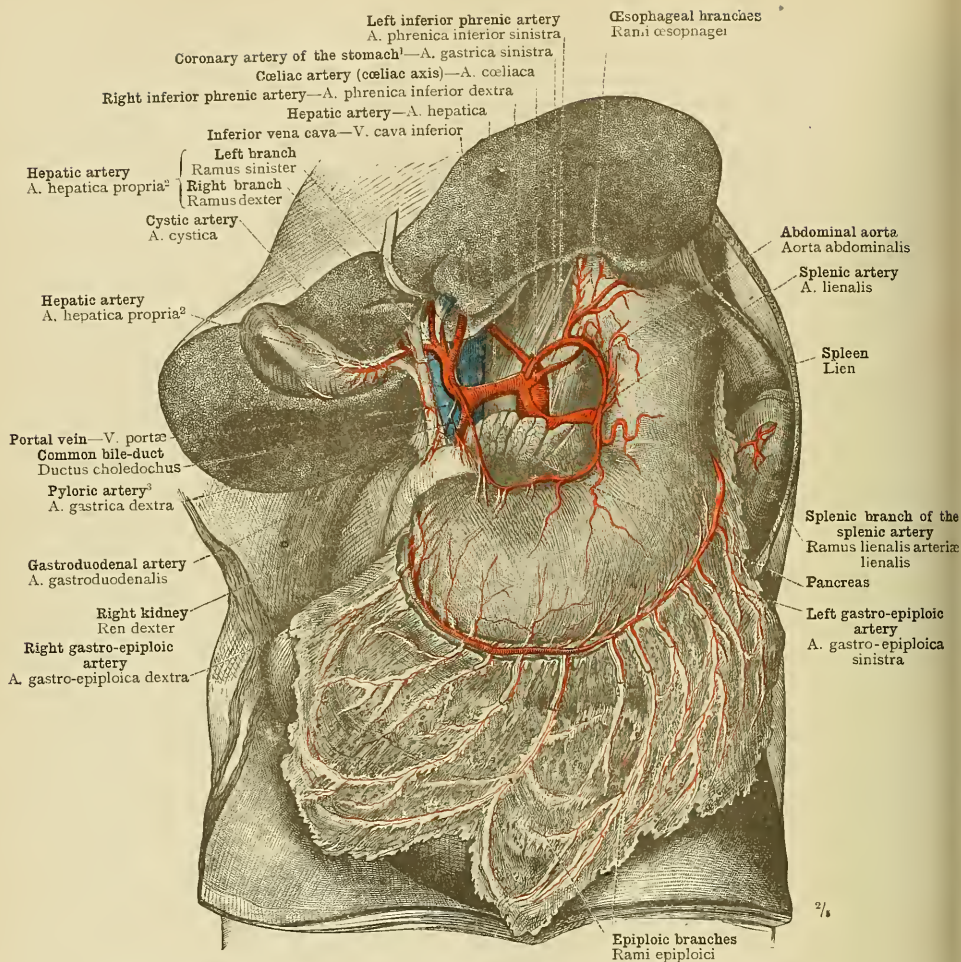
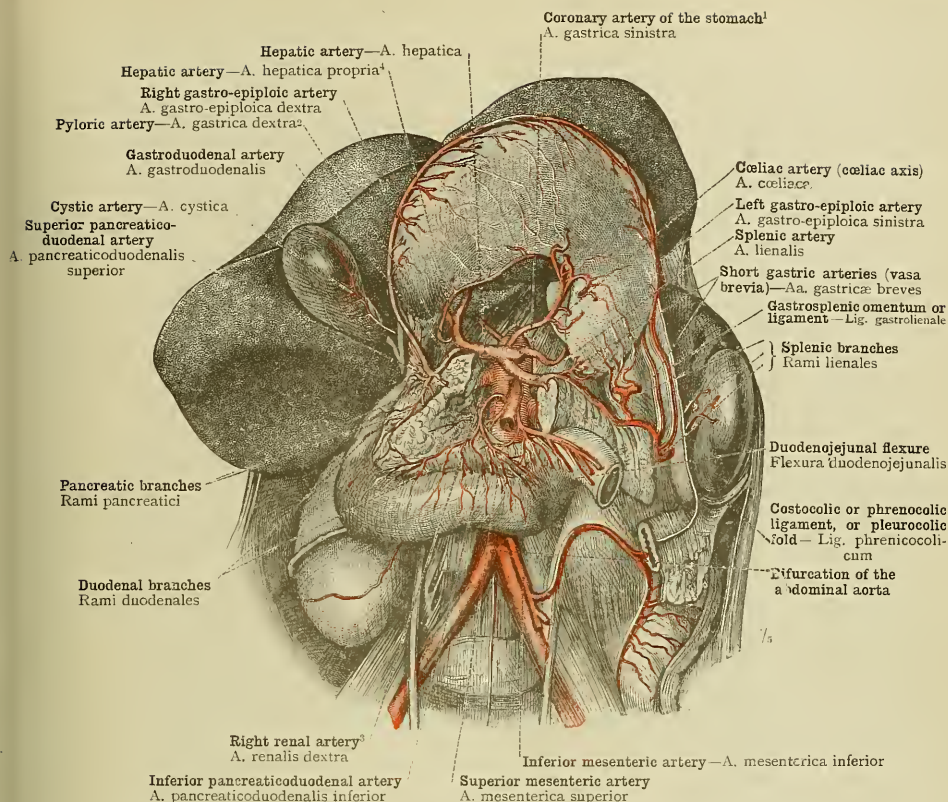
¹ Called by Macalister the *gastric artery*.² See Appendix, note 130.³ See Appendix, note 131.

FIG. 903.—THE DIVISION INTO THREE BRANCHES OF THE CELIAC ARTERY OR COELIAC AXIS (ARTERIA COELIACA, TRIPUS COELIACUS HALLERI) DISPLAYED FROM BEFORE BY THE REMOVAL OF THE SMALL OR GASTROHEPATIC OMENTUM. THESE BRANCHES ARE: THE CORONARY ARTERY OF THE STOMACH (ARTERIA GASTRICA SINISTRA—GASTRIC ARTERY, ACCORDING TO MACALISTER); THE SPLENIC ARTERY (ARTERIA SPLENICA); AND THE HEPATIC ARTERY (ARTERIA HEPATICA), WHICH DIVIDES INTO THE GASTRODUODENAL ARTERY AND THE *ARTERIA HEPATICA PROPRIA, THE LATTER GIVING OFF THE PYLORIC ARTERY (ARTERIA GASTRICA DEXTRA—SUPERIOR PYLORIC ARTERY, ACCORDING TO MACALISTER), AND THEN DIVIDING INTO LEFT AND RIGHT HEPATIC ARTERIES (see Appendix, note 130). THE CYSTIC ARTERY IS DERIVED FROM THE RIGHT HEPATIC ARTERY; THE RIGHT GASTRO-EPIPLOIC ARTERY FROM THE GASTRODUODENAL ARTERY; AND THE LEFT GASTRO-EPIPLOIC ARTERY FROM THE SPLENIC ARTERY. IN THE GREAT OMENTUM, WHICH IS SPREAD OUT FLAT, ARE SEEN THE EPIPLOIC BRANCHES OF THE GASTRO-EPIPLOIC ARTERIES. IN THE *HEPATODUODENAL LIGAMENT (part of the small or gastrohepatic omentum—see Appendix to Part IV, note 45) WE OBSERVE THE MUTUAL RELATIONS OF THE HEPATIC ARTERY, THE PORTAL VEIN, AND THE COMMON BILE-DUCT. THE LEFT INFERIOR PHRENIC ARTERY IS IN THIS SPECIMEN DERIVED FROM THE COELIAC AXIS (A COMMON VARIETY),

The Asymmetrical Visceral Branches of the Abdominal Aorta.

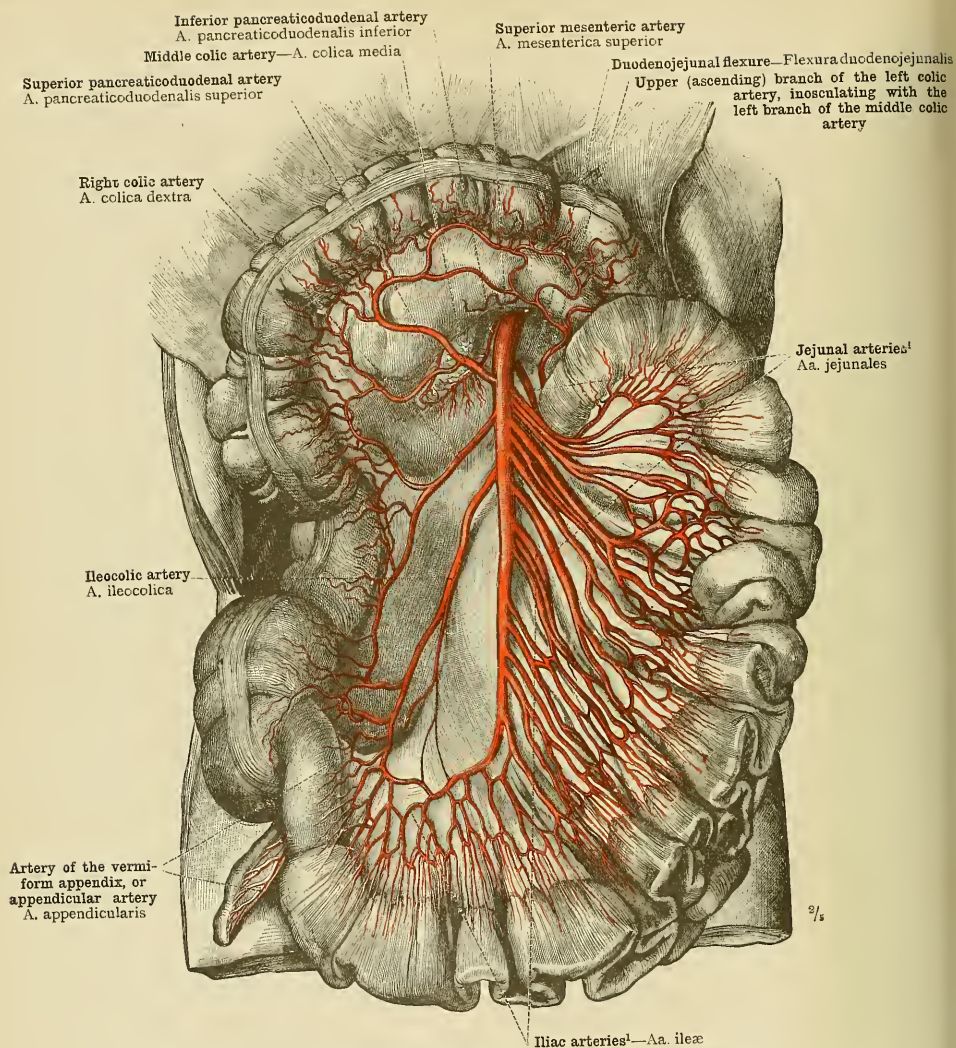


¹ Called by Macalister the *gastric artery*.
² Called by Macalister the *superior pyloric artery*—see Appendix, note 131.
³ The *renal arteries* are sometimes known as the *emulgent arteries*, but the term is now rarely used. The name is derived from the function of the organs they supply (*emulgeo*, I milk or drain out).—Tr.
⁴ See Appendix, note 132.

FIG. 984.—THE DISTRIBUTION OF THE BRANCHES OF THE CÆLIAC ARTERY OR CÆLIAC AXIS (ARTERIA CÆLIACA. TRIPUS CÆLIACUS HALLERI), SEEN FROM BEFORE: THE SPLENIC ARTERY. ARTERIA LIENALIS; ITS OFFSETS TO THE PANCREAS AND THE SPLEEN, RAMI PANCREATICI ET LIENALES; THE SHORT GASTRIC ARTERIES (VASA BREVIA), ARTERIÆ GASTRICÆ BREVES; THE LEFT GASTRO-EPIPLOIC ARTERY, ARTERIA GASTRO-EPIPLOICA SINISTRA, AND ITS ANASTOMOSIS WITH THE RIGHT GASTRO-EPIPLOIC ARTERY, ARTERIA GASTRO-EPIPLOICA DEXTRA; THE BIFURCATION OF THE GASTRODUODENAL ARTERY, ARTERIA GASTRODUODENALIS; THE PANCREATIC AND DUODENAL OFFSETS, RAMI PANCREATICI ET DUODENALES, OF THE SUPERIOR AND INFERIOR PANCREATICODUODENAL ARTERIES, ARTERIÆ PANCREATICODUODENALES, SUPERIOR ET INFERIOR.

In the preparation shown in Fig. 983, the liver was drawn upwards as far as possible, and the stomach also turned up. The duodenum and the pancreas were laid bare. By the removal of a portion of the body of the pancreas, the abdominal aorta with the origin of the two renal arteries and the superior mesenteric artery was exposed. The great or gastrocolic omentum was removed, except the gastrosplenic omentum or ligament, which was left intact.

The Asymmetrical Visceral Branches of the Abdominal Aorta.

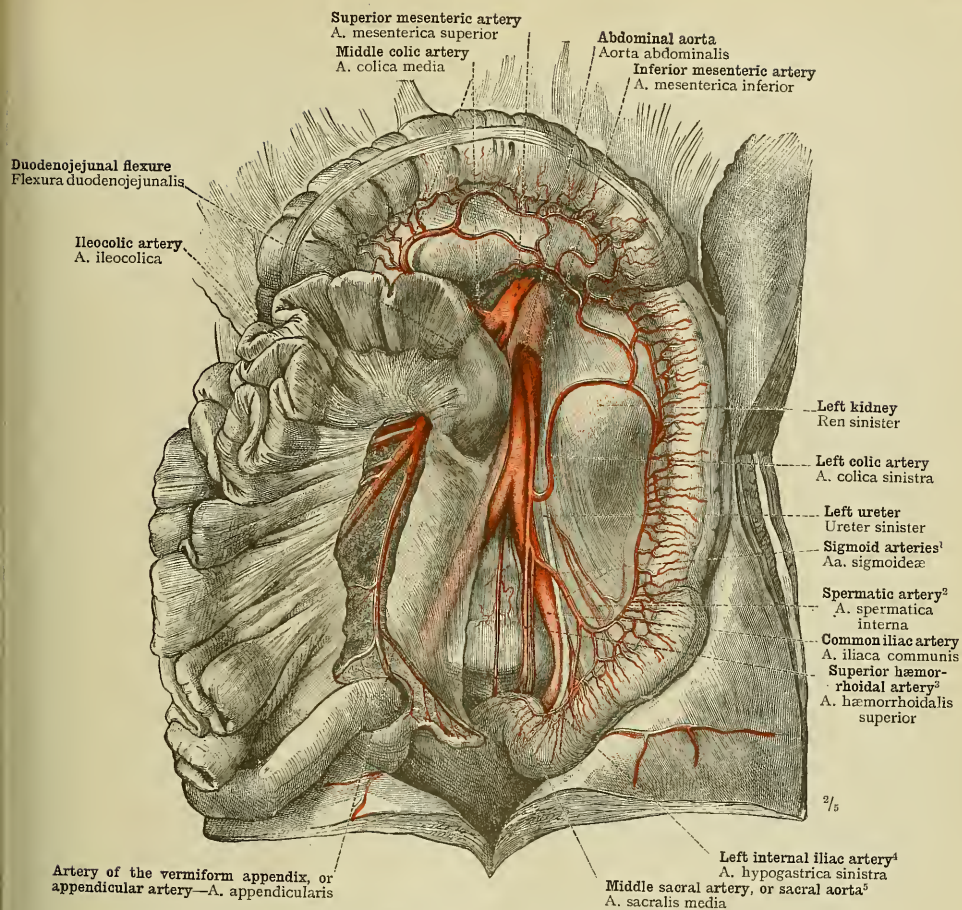


¹ *Jejunal and Iliac Arteries.*—Quain calls these indifferently the *intestinal branches* of the superior mesenteric artery; but Macalister, like Toldt, classifies the upper half as *jejunal*, and the lower half as *iliac arteries*.—*Tr.*

FIG. 985.—THE DISTRIBUTION OF THE SUPERIOR MESENTERIC ARTERY, ARTERIA MESENTERICA SUPERIOR. THE INTESTINAL ARTERIES, ARTERIE INTESTINALES: SUPERIOR PANCREATICODUODENAL ARTERY, ARTERIA PANCREATICODUODENALIS SUPERIOR; JEJUNAL AND ILIAC ARTERIES, ARTERIE JEJUNALES ET ILIACÆ; ILEO-COLIC ARTERY, ARTERIA ILEOCOLICA, GIVING OFF THE ARTERY OF THE VERMIFORM APPENDIX OR APPENDICULAR ARTERY, ARTERIA APPENDICULARIS; THE RIGHT COLIC ARTERY, ARTERIA COLICA DEXTRA; THE MIDDLE COLIC ARTERY, ARTERIA COLICA MEDIA.

The jejunum and ileum with their mesentery have been drawn to the left side; the colon and the transverse mesocolon have been drawn upwards.

The Asymmetrical Visceral Branches of the Abdominal Aorta.



¹ Sigmoid Artery.—This branch of the inferior mesenteric artery is described as normally single. Two sigmoid arteries, as in the specimen figured above, are, however, of quite frequent occurrence; and in some instances as many as three may be met with.—Tr.

² See Appendix, note 129.

³ Called by Macalister the *anterior rectal artery*.

⁴ See Appendix, note 129.

⁵ See Appendix, note 127.

FIG. 986.—THE DISTRIBUTION OF THE INFERIOR MESENTERIC ARTERY, ARTERIA MESENTERICA INFERIOR: THE LEFT COLIC ARTERY, ARTERIA COLICA SINISTRA, AND ITS INOSCULATION WITH THE MIDDLE COLIC ARTERY, ARTERIA COLICA MEDIA; THE SIGMOID ARTERIES, ARTERIÆ SIGMOIDÆ, AND THE SUPERIOR HÆMORRHOIDAL (OR SUPERIOR RECTAL) ARTERY, ARTERIA HÆMORRHOIDALIS SUPERIOR. THE ILEOCOLIC ARTERY, ARTERIA ILEOCOLICA, DERIVED FROM THE SUPERIOR MESENTERIC ARTERY, ARTERIA MESENTERICA SUPERIOR, AND SUPPLYING THE ARTERY OF THE VERMIFORM APPENDIX OR APPENDICULAR ARTERY, ARTERIA APPENDICULARIS.

In the preparation shown in Fig. 985, the colon and the transverse mesocolon were drawn upwards; the jejunum and ileum with their mesentery to the left. By cutting through the left peritoneal layer of the mesentery of the small intestine, the ileocolic artery was exposed, and its offset to the vermiform appendix (appendicular artery) was traced to its destination.

The Asymmetrical Visceral Branches of the Abdominal Aorta.

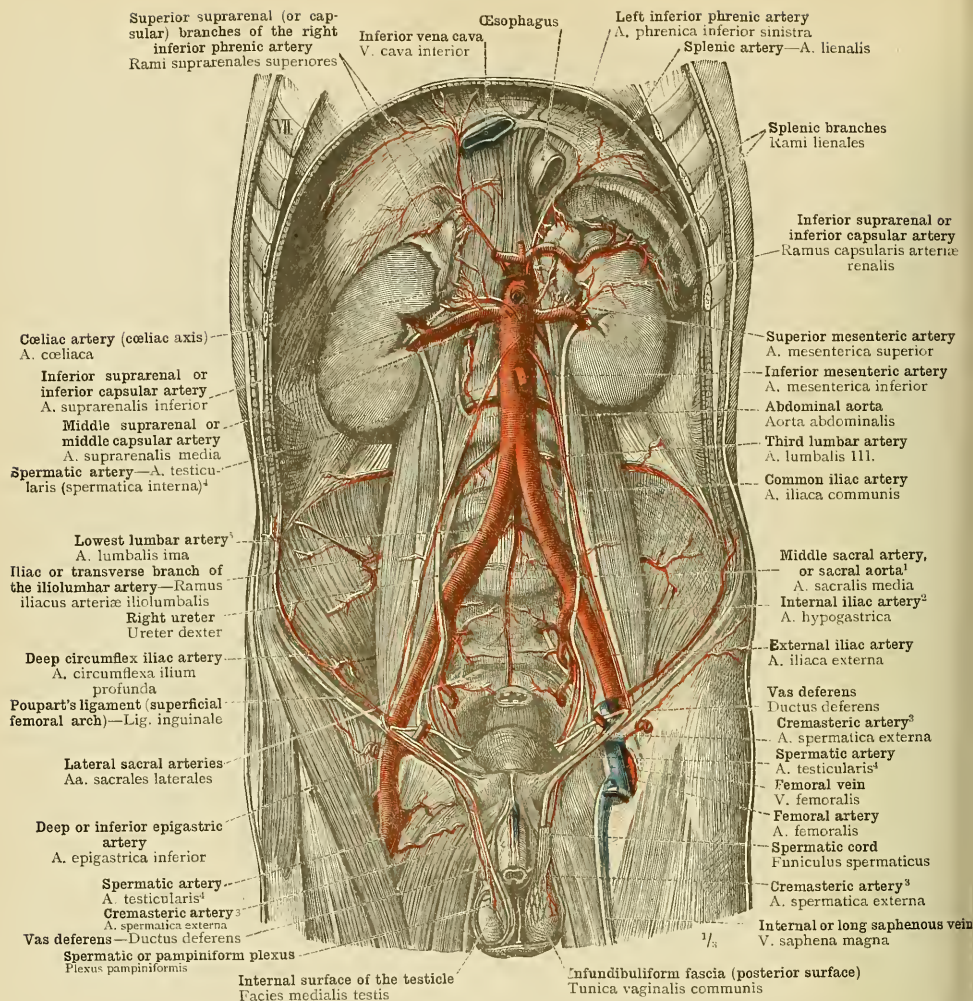
¹ See Appendix, note 127.⁴ Arteria Testicularis.—This name is used by the author as a synonym for *arteria spermatica interna*, the spermatic artery of English anatomists. (See Appendix, note 127).—T.² See Appendix, note 120.³ See Appendix, note 129.⁵ See Appendix, note 126.

FIG. 987.—THE PARIETAL BRANCHES AND THE SYMMETRICAL (PAIRED) VISCERAL BRANCHES OF THE ABDOMINAL AORTA: THE INFERIOR PHRENIC OR INFERIOR DIAPHRAGMATIC ARTERIES AND THE LUMBAR ARTERIES; THE MIDDLE SACRAL ARTERY, OR SACRAL AORTA, AND THE LATERAL SACRAL ARTERIES; THE SPLENIC ARTERIES; THE RENAL OR EMULGENT ARTERIES (see note ³ to p. 595), AND THE SUPRARENAL OR CAPSULAR ARTERIES; THE SPERMATIC ARTERIES (ARTERIE TESTICULARES ET ARTERIE SPERMATICÆ INTERNÆ), AND THE CREMASTERIC ARTERIES (ARTERIE SPERMATICÆ EXTERNÆ) see Appendix, note 129.

The abdominal viscera were removed, with the exception of the spleen, the kidneys, and the suprarenal capsules (adrenals). After removing the anterior half of the scrotum, the internal surface of the right testicle was laid bare by the removal of its coverings, in order to display the entrance of the spermatic artery to the gland; the left testicle was rotated inwards, in order to show the terminal ramification of the cremasteric artery on the infundibuliform fascia, and between the fasciculi of the cremaster muscle.

The Parietal Branches and the Symmetrical (Paired) Visceral Branches of the Abdominal Aorta.

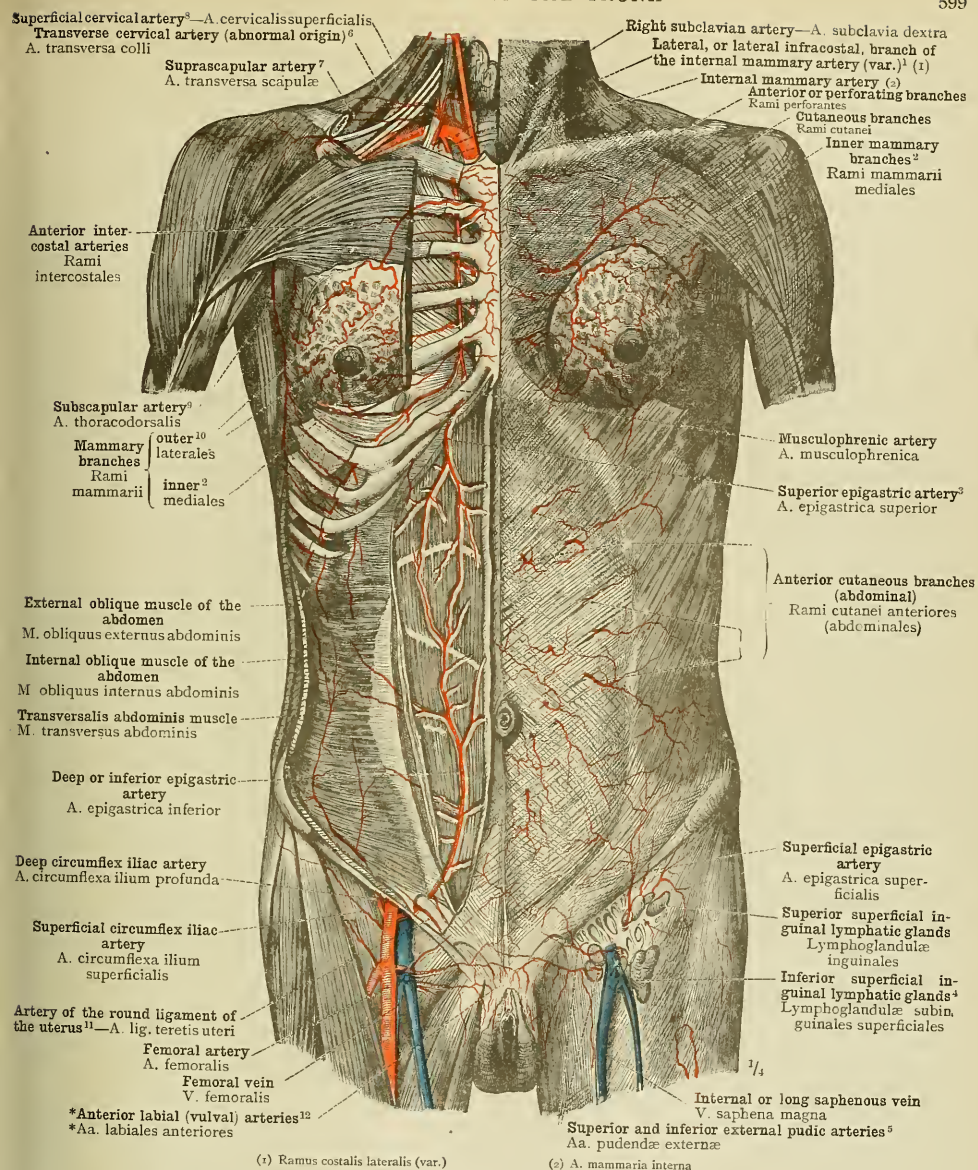


FIG. 988.—ON THE LEFT SIDE OF THE BODY THE SUPERFICIAL ARTERIES ARE SHOWN; ON THE RIGHT SIDE IN THE INTERCOSTAL SPACES THE INTERNAL MAMMARY ARTERY AND ITS MUSCULOPHRENIC BRANCH (ARTERIE MAMMARIA INTERNA ET MUSCULOPHRENICA) ARE EXPOSED, ALSO, BY PARTIAL REMOVAL OF THE RECTUS ABDOMINIS MUSCLE, THE SUPERIOR EPIGASTRIC ARTERY AND THE INFERIOR OR DEEP EPIGASTRIC ARTERY (ARTERIE EPIGASTRICÆ, SUPERIOR ET INFERIOR).

The Arteries of the Anterior Wall of the Trunk.

¹ See Appendix, note 132.

² See Appendix, note 133.

³ Also called the abdominal branch of the internal mammary artery.

⁴ Often called the femoral lymphatic glands.

⁵ The upper of these is named by Macalister the superior or superficial pubic; the lower, the inferior pubic artery.—Tr.

⁶ See Appendix, note 114.

⁷ Called also the transverse scapular or transverse humeral artery.

⁸ See Appendix, note 135.

⁹ See Appendix, note 136.

¹⁰ See Appendix, note 137.

¹¹ This branch of the inferior or deep epigastric artery is the homologue in the female of the cremasteric artery of the male.—Tr.

¹² See Appendix, note 138.

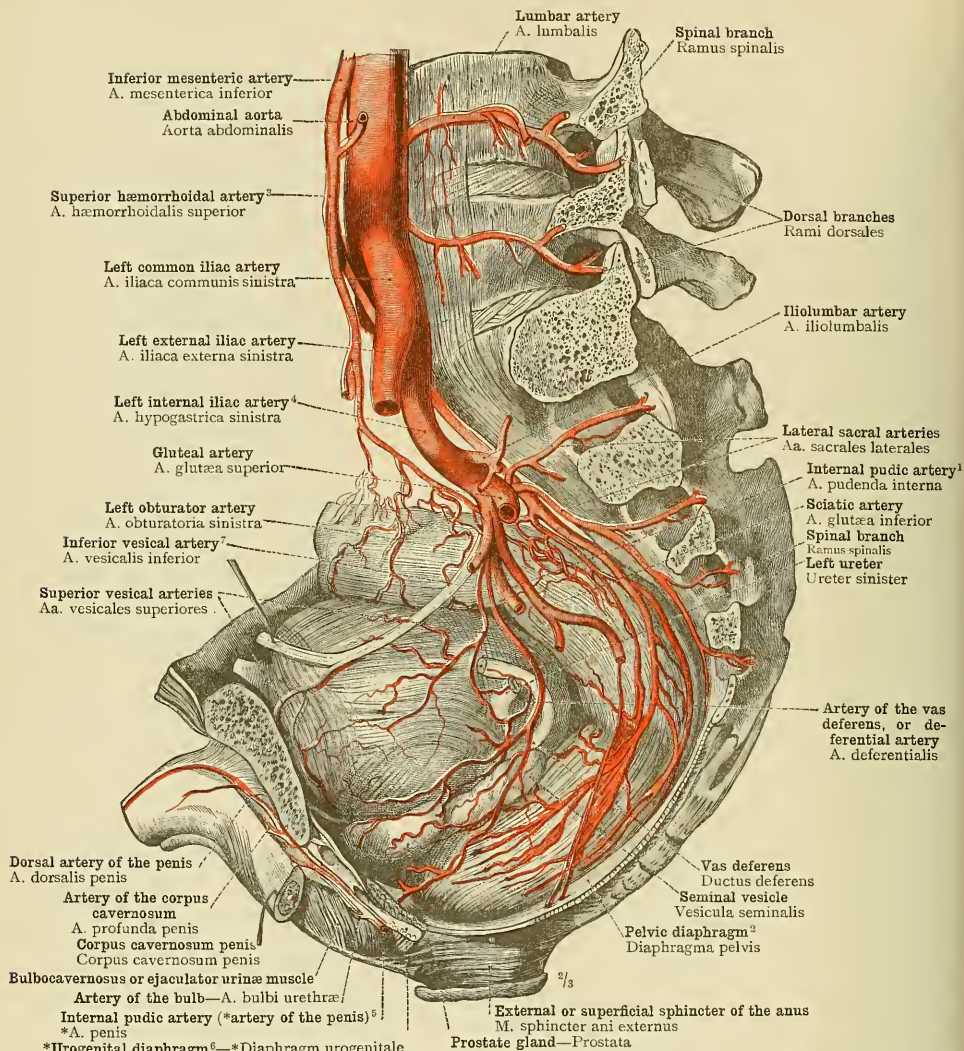


FIG. 989.—THE VISCERAL BRANCHES, RAMI VISCERALES, OF THE INTERNAL ILIAC ARTERY, ARTERIA HYPOGASTRICA (see Appendix, note 120), AS SEEN ON THE LEFT SIDE OF THE MALE PELVIS.

The left innominate bone was sawn through close to the pubic symphysis, and was removed together with the left part of the sacrum; a small part of the left side of the pelvic diaphragm (see Appendix, note 140) was preserved, and was drawn down a little towards the perineum. Further, by the removal of the transverse processes of the fourth and fifth lumbar vertebrae, the dorsal branches of the two lowest lumbar arteries and the lateral sacral arteries were displayed, and their spinal branches (rami spinales) were traced to their entrance into the spinal canal.

The Arteries of the Male Pelvic Viscera.

¹ See Appendix, note 139.
⁴ See Appendix, note 200.

² See Appendix, note 140.
⁵ See Appendix, note 141.

³ Called by Macalister the *superior rectal artery*.
⁶ See Appendix, note 142.
⁷ See Appendix, note 143.

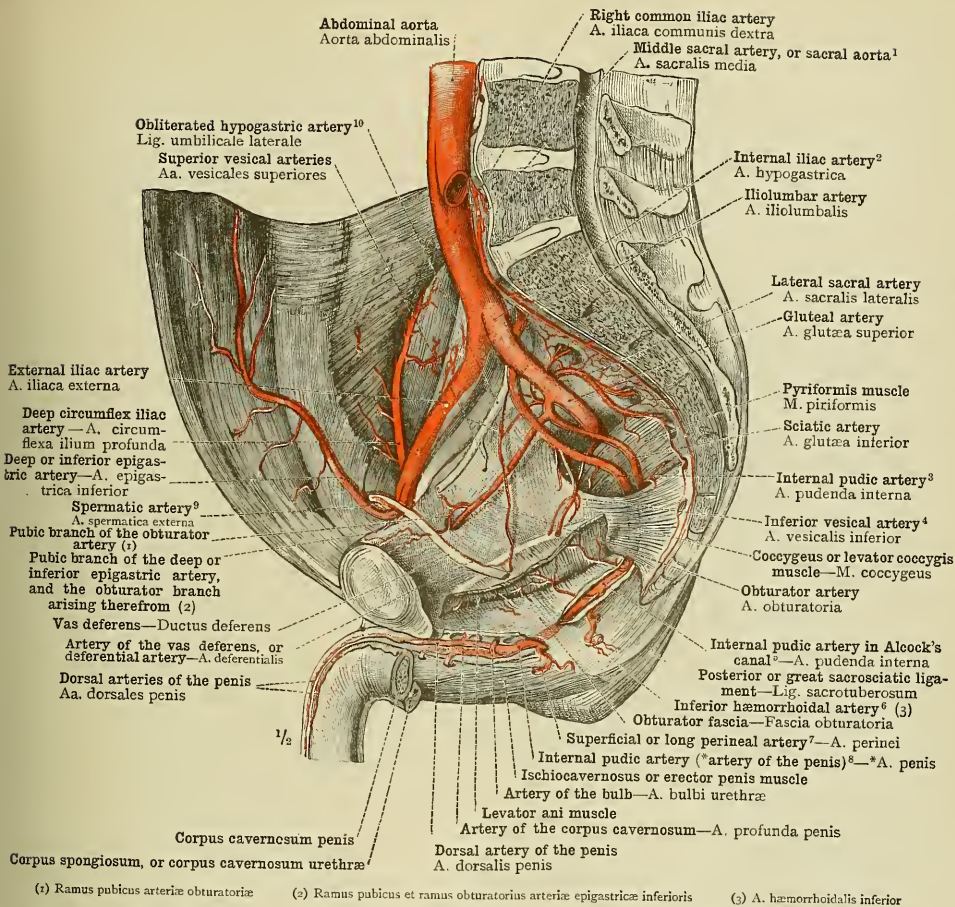
¹ See Appendix, note 127.⁴ See Appendix, note 144.⁷ See Appendix, note 147.¹⁰ See Appendix, note 145.² See Appendix, note 129.⁵ See Appendix, note 145.⁸ See Appendix, note 144.³ See Appendix, note 129.⁶ See Appendix, note 146.⁹ See Appendix, note 129.

FIG. 990.—THE PARIETAL BRANCHES, RAMI PARIETALES, OF THE INTERNAL ILIAC ARTERY, ARTERIA HYPOGASTRICA (see Appendix, note 129): ARTERIA ILIOLUMBALIS, THE ILIOLUMBAR ARTERY; ARTERIA SACRALIS LATERALIS ET ARTERIA SACRALIS MEDIA, THE LATERAL SACRAL ARTERY AND THE MIDDLE SACRAL ARTERY (OR SACRAL AORTA—see Appendix, note 127); ARTERIA GLUTEA SUPERIOR ET ARTERIA GLUTEA INFERIOR, THE GLUTEAL ARTERY AND THE SCIATIC ARTERY; ARTERIA OBTURATORIA, THE OBTURATOR ARTERY, AND THE ANASTOMOSIS OF ITS PUBIC BRANCH (RAMUS PUBICUS) WITH THE OBTURATOR BRANCH (RAMUS OBTURATORIUS) OF THE DEEP OR INFERIOR EPIGASTRIC ARTERY (ARTERIA EPIGASTRICA INFERIOR), AND THE ANASTOMOSIS OF ITS PUBIC BRANCH (RAMUS PUBICUS) WITH THE OBTURATOR BRANCH (RAMUS OBTURATORIUS) OF THE DEEP OR INFERIOR EPIGASTRIC ARTERY; ARTERIA EPIGASTRICA INFERIOR, THE DEEP OR INFERIOR EPIGASTRIC ARTERY, WITH THE SPERMATIC ARTERY (ARTERIA SPERMATICA EXTERNA—see Appendix, note 129) AND THE ARTERY OF THE VAS DEFERENS OR DEFERENTIAL ARTERY (ARTERIA DEFERENTIALIS). THE COURSE OF THE INTERNAL PUDIC ARTERY (ARTERIA PUDENDA INTERNA), AND THE ORIGIN OF THE BRANCHES TO THE EXTERNAL GENITAL ORGANS (see Appendix, notes 129, 144, 145 and 147).

In the preparation shown in Fig. 989, the pelvic viscera and the remains of the left half of the pelvis were removed; the levator ani muscle was turned upwards, and beneath this muscle the outer layer of the obturator fascia was removed to display the internal pudic artery in Alcock's canal (see Appendix, note 145). The bulb of the urethra and the left crus of the penis were removed, to show the entrance of the artery of the corpus cavernosum (arteria profunda penis) into the structure which it supplies, and the course of the dorsal artery of the penis (arteria dorsalis penis) on to the dorsum of the penis.

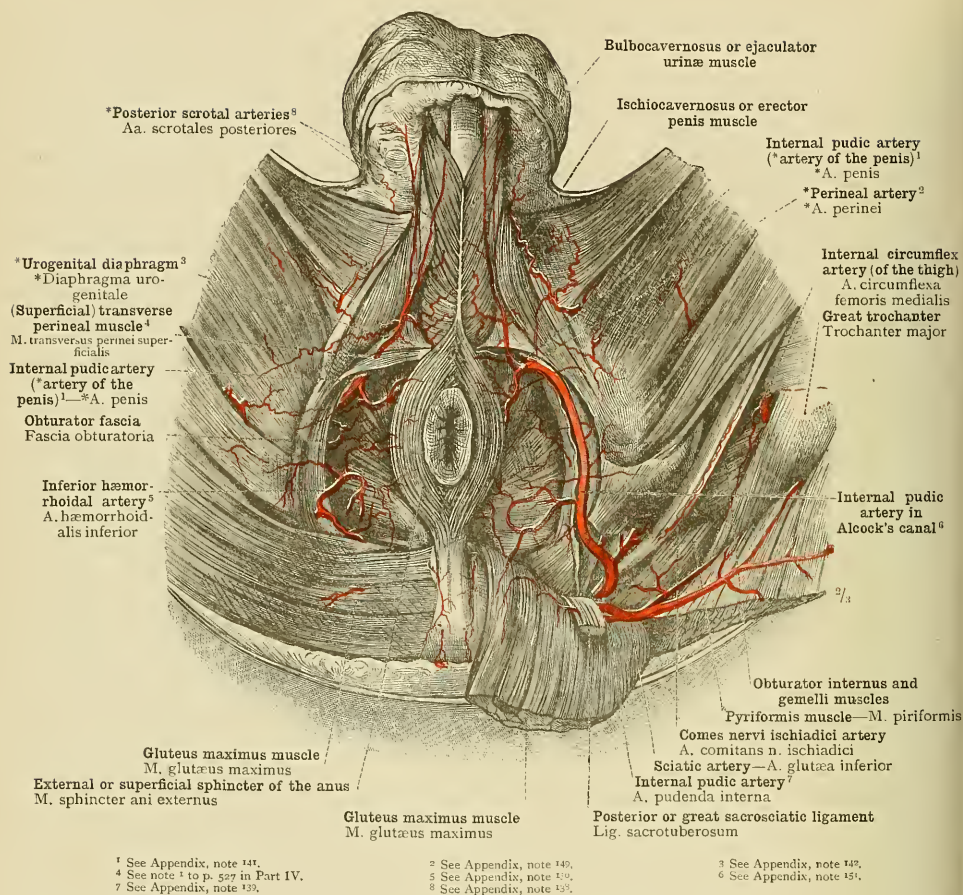


FIG. 991.—THE COURSE AND DISTRIBUTION OF THE INTERNAL PUDIC ARTERY (ARTERIA PUDENDA INTERNA) IN THE MALE PERINEAL REGION: THE INFERIOR OR EXTERNAL HÆMORRHOIDAL ARTERY (ANAL ARTERY, ACCORDING TO MACALISTER), ARTERIA HÆMORRHOIDALIS INFERIOR, AND THE *PERINEAL ARTERY (*i.e.*, TRANSVERSE PERINEAL AND SUPERFICIAL OR LONG PERINEAL ARTERIES—see Appendix, notes 147 and 149), ARTERIA PERINEI, WITH THE TERMINATION OF THE SUPERFICIAL OR LONG PERINEAL ARTERY BY ITS DIVISION INTO THE TWO POSTERIOR SCROTAL ARTERIES, ARTERIÆ SCROTALES POSTERIORES (see Appendix, note 138).

On the left side of the body, the course of the internal pudic artery (arteria pudenda interna) is shown from its emergence from the pelvis through the great sacrosclatic foramen until it penetrates the base of the triangular ligament of the urethra (in the author's terminology, up to its entrance into the *urogenital diaphragm—see Appendix, note 142); the gluteus maximus muscle has been partially divided by an incision passing upwards from its lower border and has been turned upwards, the great sacrosclatic ligament has been divided, Alcock's canal has been opened (see Appendix, note 131), and the (superficial) transverse muscle of the perineum has been entirely removed.

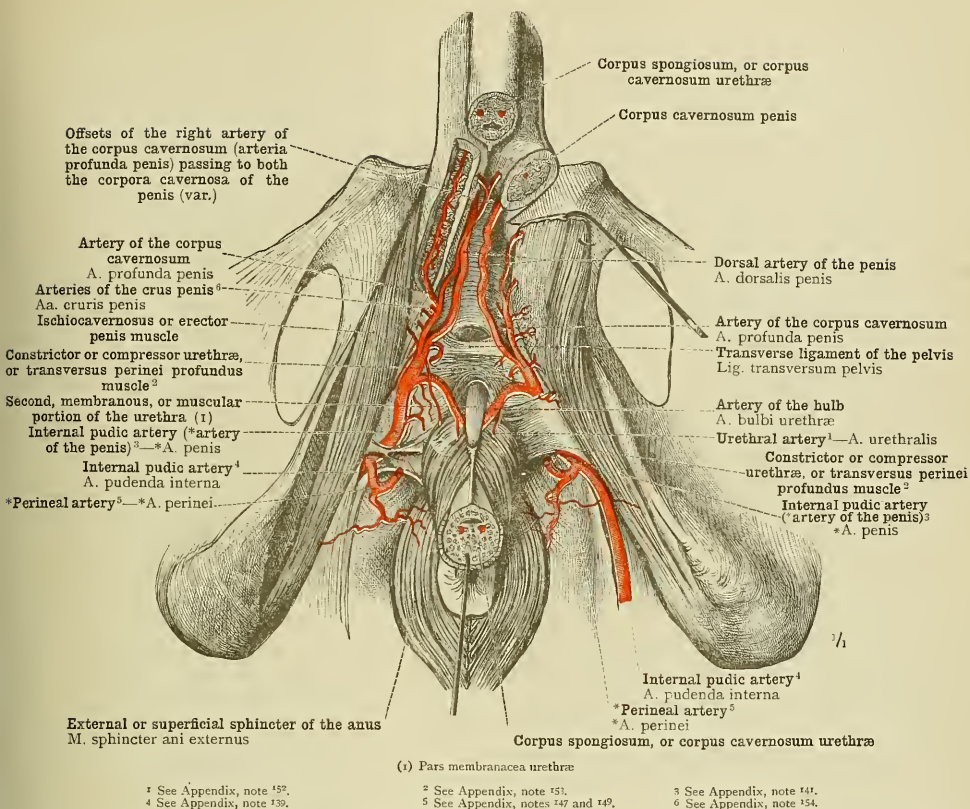
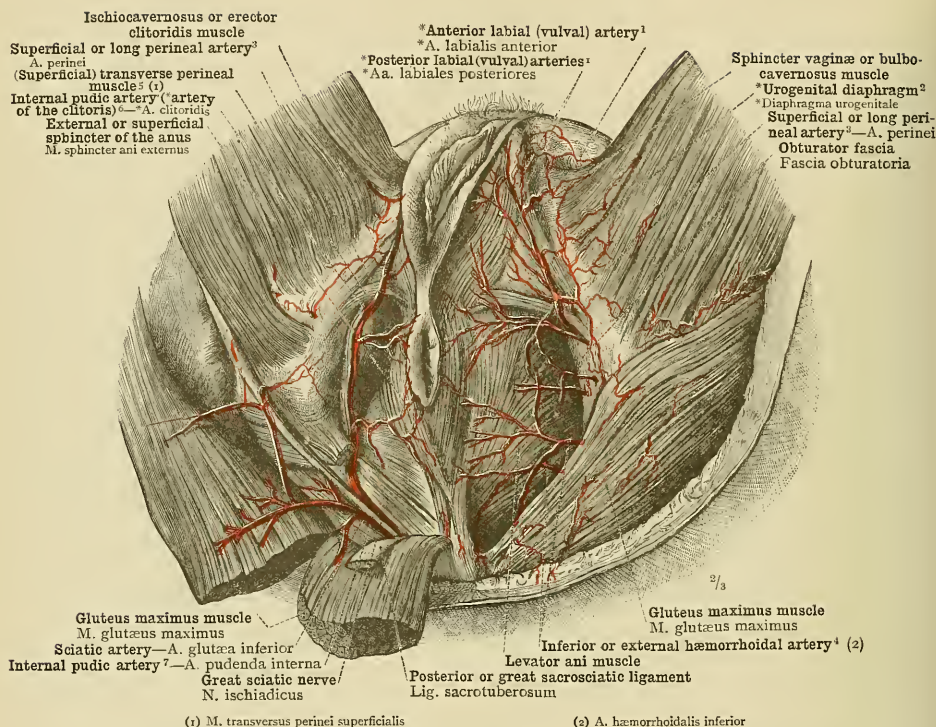


FIG. 992.—THE TERMINAL BIFURCATION OF THE INTERNAL PUDIC ARTERY (*ARTERY OF THE PENIS, ACCORDING TO TOLDT—see Appendix, note 141) INTO THE ARTERY OF THE CORPUS CAVERNOSUM (ARTERIA PROFUNDA PENIS) AND THE DORSAL ARTERY OF THE PENIS (ARTERIA DORSALIS PENIS). PRIOR TO THE BIFURCATION, THE FOLLOWING DEEP BRANCHES ARE SUPPLIED: ARTERIA BULBI URETHRÆ, THE ARTERY OF THE BULB; ARTERIA URETHRALIS, THE URETHRAL ARTERY; ARTERIÆ CRURIS PENIS, THE ARTERIES OF THE CRUS PENIS.

On the left side of the body, the superficial layer of the obturator fascia where it covers the internal pudic artery in the ischiorectal fossa has been removed throughout the whole length of Alcock's canal (see Appendix, note 145), so that the artery is exposed up to its disappearance between the layers of the constrictor or compressor urethræ or transversus perinei profundus muscle; on the right side of the body, by the removal of the superficial fibres of that muscle, the artery is exposed in the anterior half of the perineum (called by the author in this part of its course the *artery of the penis, *arteria penis—see Appendix, note 141). The corpus spongiosum, or corpus cavernosum urethræ, has been divided transversely in front of the pubic symphysis, the bulb of the urethra has been separated from the *urogenital diaphragm (see Appendix, note 142) and turned backwards, in order to show the artery of the bulb entering the dorsal (deep) surface of the bulb. The left crus of the penis has been divided transversely and drawn a little outwards, to display more fully the entrance of the branches of the artery of the corpus cavernosum. On the right side the corresponding artery has been traced for some distance within the substance of the corpus cavernosum. Before entering the corpus cavernosum this (right) artery gives an offset which bifurcates in the angle between the two corpora cavernosa, the two branches entering the right and the left corpus cavernosum, respectively.



¹ See Appendix, note ¹³⁸.

⁴ Called by Macalister the *anal artery*.

⁷ See Appendix, note ¹³⁹.

² See Appendix, note ¹⁴².

⁵ See note ¹ to p. 527 in Part IV.

³ See Appendix, note ¹⁵⁵.

⁶ See Appendix, note ¹⁵⁶.

FIG. 993.—THE SUPERFICIAL BRANCHES OF THE INTERNAL PUDIC ARTERY, ARTERIA PUDENDA INTERNA, IN THE FEMALE PERINEAL REGION: THE INFERIOR OR EXTERNAL HÆMORRHOIDAL ARTERY (ANAL ARTERY, ACCORDING TO MACALISTER), ARTERIA HÆMORRHOIDALIS INFERIOR, AND THE *PERINEAL ARTERY (*i.e.*, TRANSVERSE PERINEAL ARTERY AND SUPERFICIAL OR LONG PERINEAL ARTERY—see Appendix, notes ¹⁴⁷, ¹⁴⁹, and ¹⁵⁵), ARTERIA PERINEI, WITH THE TERMINATION OF THE SUPERFICIAL OR LONG PERINEAL ARTERY BY ITS DIVISION INTO THE POSTERIOR LABIAL ARTERIES, ARTERIÆ LABIALES POSTERIORES (see Appendix, note ¹³⁸).

On the right side of the body the gluteus maximus muscle was partially divided by an incision passing upwards from its lower border, and was turned upwards; the posterior or great sacrosacral ligament, ligamentum sacrotuberosum, was cut completely across, and turned upwards with the gluteus maximus muscle. By the removal of the superficial layer of the obturator fascia where it covers the internal pudic artery in Alcock's canal (see Appendix, note ¹⁴⁵), that canal was opened throughout, and the artery was exposed from its point of emergence from the pelvis to the point at which it perforates the base of the triangular ligament (or, in the author's terminology, to the point at which it enters the *urogenital diaphragm—see Appendix, note ¹⁴²).

The Arteries of the Female Perineal Region.

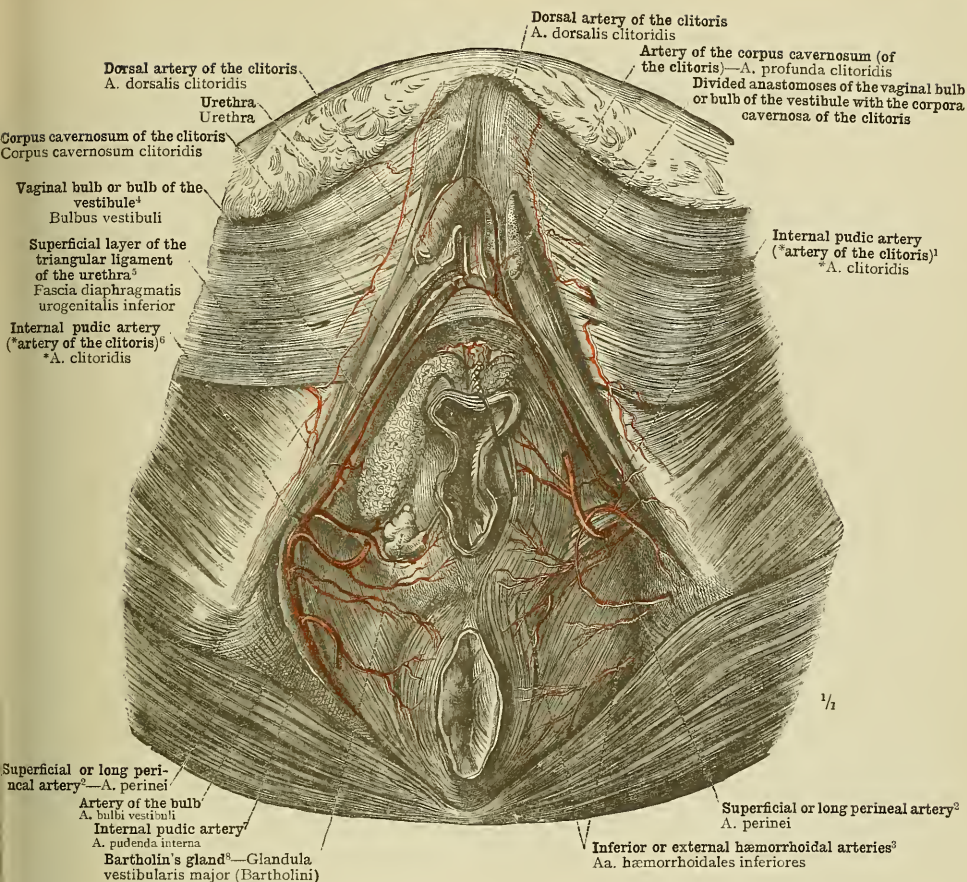


FIG. 994.—THE DEEP BRANCHES OF THE INTERNAL PUDIC ARTERY, ARTERIA PUDENDA EXTERNA IN THE UROGENITAL REGION,⁹ REGIO UROGENITALIS, OF THE FEMALE PERINEAL REGION. THE BRANCHES OF THE *ARTERY OF THE CLITORIS, ARTERIA CLITORIDIS (see Appendix, note 156): THE ARTERY OF THE BULB, ARTERIA BULBI VESTIBULÆ (VAGINÆ); THE ARTERY OF THE CORPUS CAVERNOSUM (OF THE CLITORIS), ARTERIA PROFUNDA CLITORIDIS; AND THE DORSAL ARTERY OF THE CLITORIS, ARTERIA DORSALIS CLITORIDIS. THE DORSAL ARTERIES OF THE CLITORIS, ARTERIÆ DORSALES CLITORIDIS, ARE CONNECTED WITH ONE ANOTHER BY AN ANASTOMOTIC ARCH SITUATE ON THE SUPERFICIAL SURFACE OF THE INFERIOR PUBIC OR SUPPUBIC LIGAMENT (LIGAMENTUM ARCUATUM PUBIS).

In the preparation shown in Fig. 993, the labia majora and the labia minora or nymphæ were removed by a frontal section; on the right side of the body, the sphincter vaginae or bulbocavernosus muscle and the (superficial) transverse muscle of the perineum (see note ¹ to p. 527 in Part IV.) were removed, the anastomoses between the vaginal bulb or bulb of the vestibule and the clitoris were divided, and the passage of the urethra through the "urogenital diaphragm" (see Appendix, note 142) was displayed by drawing the vagina backwards. The right corpus cavernosum of the clitoris was divided by a longitudinal section commencing at the point of entry of the artery of that body (arteria profunda clitoridis), and this artery was traced for some distance within its substance. The left corpus cavernosum was divided transversely at the point of entry of its artery (arteria profunda clitoridis), and by separating the segments of the crus the course of the dorsal artery of the clitoris, arteria dorsalis clitoridis, to its destination was exposed.

¹ See Appendix, note 156.

² See Appendix, note 157.

³ See Appendix, note 158.

⁴ See Appendix, note 159.

⁵ See Appendix to Part IV., note 99.

⁶ See Appendix, note 156.

⁷ See Appendix, note 159.

⁸ Known also as *Duguesney's gland*, or the *suburethral gland*. (See Appendix to Part IV., note 66.)—Tr.

⁹ Generally known in England as the *anterior half of the perineal space*.—Tr.

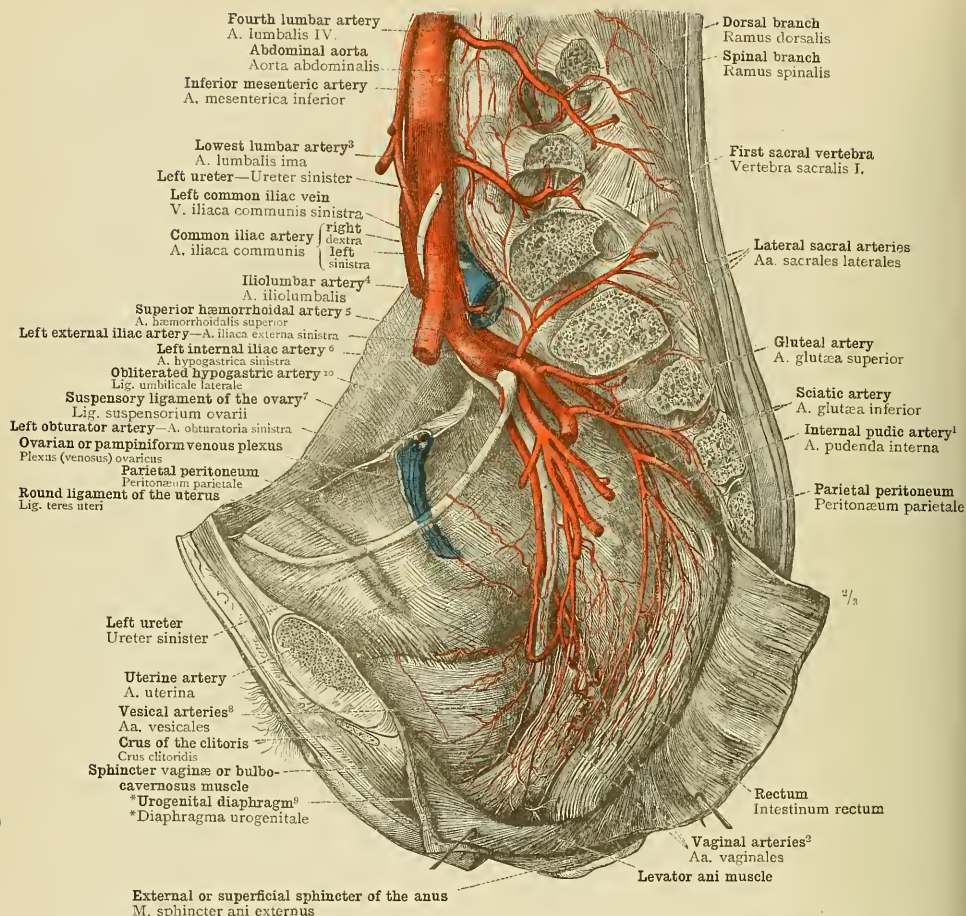
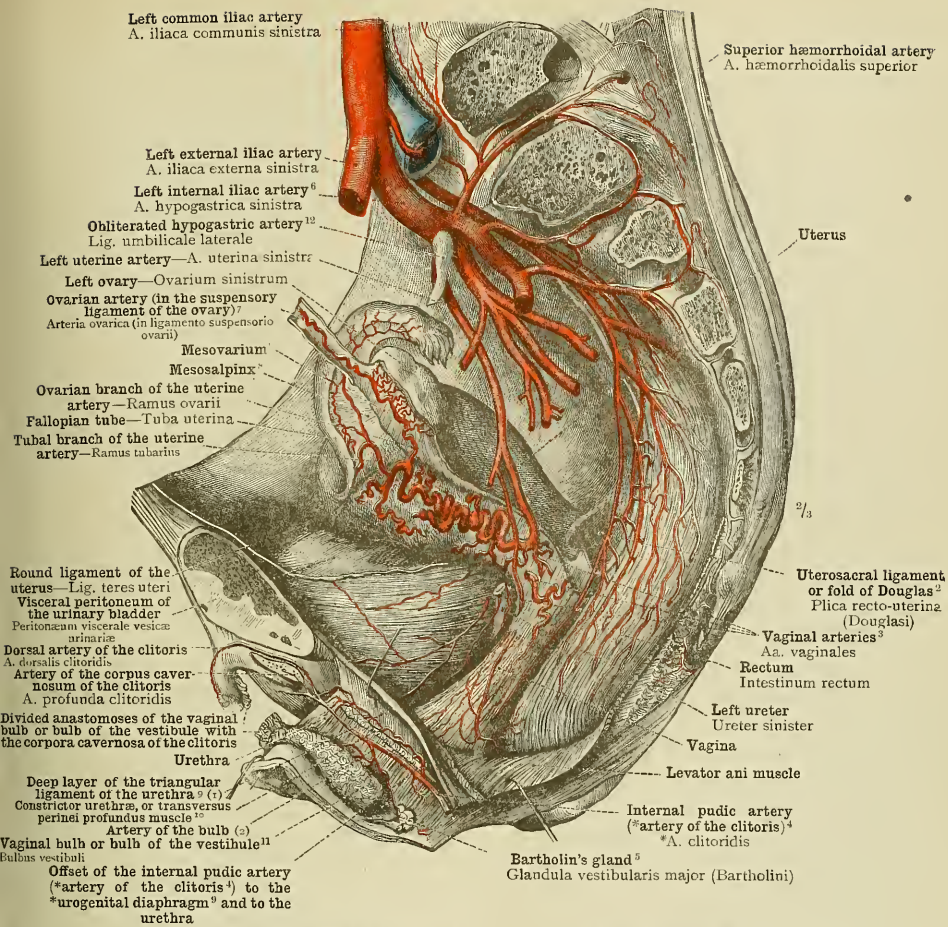
¹ See Appendix, note 139.² See Appendix, note 160.³ See Appendix, note 126.⁴ See Appendix, note 161.⁵ Called by Macalister the *superior rectal artery*.⁶ See Appendix, note 120.⁷ Called also the *infundibulopelvic or ovarioepelvic fold or ligament*.⁸ See Appendix, note 160.¹⁰ Or *external umbilical ligament—see Appendix, note 148.⁹ See Appendix, note 142.

FIG. 995.—THE LEFT INTERNAL ILIAC ARTERY, ARTERIA HYPOGASTRICA (see Appendix, note 120), AND ITS VISCERAL BRANCHES, RAMI VISCERALES, SEEN IN THE SUPRAPERITONEAL SPACE OF A FEMALE PELVIS: THE LOWEST OFFSETS OF THE SUPERIOR HÆMORRHOIDAL OR SUPERIOR RECTAL ARTERY, ARTERIA HÆMORRHOIDALIS SUPERIOR; THE UTERINE ARTERY, ARTERIA UTERINA, AS FAR AS ITS POINT OF ENTRANCE INTO THE BROAD LIGAMENT OF THE UTERUS (MESOMETRIUM); THE VAGINAL ARTERIES, ARTERIE VAGINALES (see Appendix, note 160); THE TERMINAL OFFSETS TO THE BLADDER, ARTERIE VESICALES (see Appendix, note 162), AND TO THE URETER. OF THE PARIETAL BRANCHES, RAMI PARIETALES, THE LATERAL SACRAL ARTERIES, ARTERIE SACRALES LATERALES, AND THE TWO LOWERMOST LUMBAL ARTERIES, ARTERIE LUMBALES, HAVE BEEN PRESERVED; THE SPINAL BRANCHES HAVE BEEN TRACED UP TO THEIR ENTRANCE INTO THE SPINAL CANAL.

The left lateral wall of the pelvis was removed by a section which in front passed close to the median plane, and behind, through the left row of sacral foramina; but the parietal peritoneal investment of this wall was preserved up to its reflection on to the urinary bladder, the vagina, and the rectum. The parts of these organs situate outside the peritoneum were laid bare, and the pelvic diaphragm (see Appendix, note 140) was turned downwards.

The Arteries of the Female Pelvic Viscera.



(1) Fascia diaphragmatis urogenitalis superior

(2) A. bulbi vestibuli (vaginae)

¹ Called by Macleod the *superior rectal artery*.³ See Appendix, note 160.⁵ Known also as *Duvernoy's gland*, or the *suburethral gland*. (See Appendix to Part IV., note 66.)⁷ The *suspensory ligament of the ovary* is known also as the *infundibulopelvic ligament* or *ovariopelvic fold* or *ligament*.—Tr.⁸ See Appendix to Part IV., note 82. ⁹ See Appendix to Part IV., note 92.¹⁰ *M. Transversus Perinei Profundus*.—For an account of the nomenclature of this muscle see Appendix to Part IV., note 103.—Tr.¹¹ *Bulbus Vestibuli*.—Regarding the nomenclature of this structure, see Appendix to Part IV., note 94.—Tr.¹² Or *external umbilical ligament*—see Appendix, note 140.² Known also as the *recto-uterine fold* or *ligament*.⁴ See Appendix, note 126.⁶ See Appendix, note 120.

FIG. 996.—THE DISTRIBUTION OF THE LATERAL SACRAL ARTERIES, ARTERIÆ SACRALES LATERALES, THE SUPERIOR HÆMORRHOIDAL OR SUPERIOR RECTAL ARTERY, ARTERIA HÆMORRHOIDALIS SUPERIOR, THE UTERINE ARTERY, ARTERIA UTERINA, THE OVARIAN ARTERY, ARTERIA OVARICA, AND THE DISTAL PORTION OF THE INTERNAL PUDIC ARTERY, *ARTERIA CLITORIDIS (see Appendix, note 156).

In the preparation shown in Fig. 995, the parietal peritoneum was cut away along the line of its reflection on to the rectum and the urinary bladder, and the mesometrium (*i.e.*, the broad ligament of the uterus) was severed along its attachment to the uterus, the Fallopian tube with its mesentery (the mesosalpinx) and also the suspensory ligament of the ovary were turned inwards and upwards, while the mesovarium was turned upwards and backwards, the lower layer of the latter was removed, and the ovarian artery with its ovarian offsets and its anastomosis with the uterine artery was displayed. The deep layer of the triangular ligament of the urethra was detached from the deep transverse perineal muscle and was drawn upwards, in order to show the branch of the internal pudic artery running forwards on the superficial surface of this deep layer. From a transversely disposed arch formed by the anastomosis of this branch with the corresponding vessel of the opposite side, several small offsets arise, which run forwards (downwards) along the urethra. By the removal of the superficial layer of the triangular ligament of the urethra the internal pudic artery (arteria clitoridis—see Appendix, note 156) was exposed up to its terminal bifurcation.

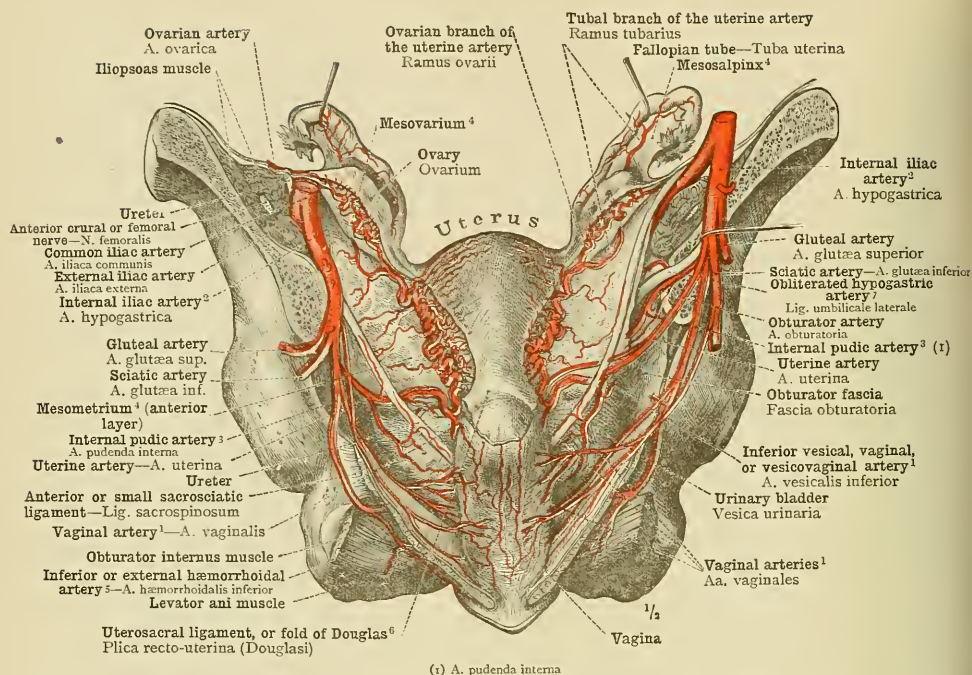
¹ See Appendix, note 163.² See Appendix, note 120.³ See Appendix, note 130.⁴ See Appendix to Part IV., note 82.⁵ Called by Macalister the anal artery.⁶ Known also as the recto-uterine fold or ligament.⁷ Or external umbilical ligament—see Appendix, note 148.

FIG. 997.—THE ARTERIES OF THE UTERUS, THE OVARIES, THE FALLOPIAN TUBES, THE VAGINA, AND THE URINARY BLADDER, SEEN FROM BEHIND: THE OVARIAN ARTERY, ARTERIA OVARICA (ARTERIA SPERMATICA INTERNA); THE UTERINE ARTERY, ARTERIA UTERINA, WITH ITS OFFSETS TO THE OVARY (RAMUS OVARII), THE FALLOPIAN TUBE (RAMUS TUBARIUS), THE VAGINA ARTERIÆ VAGINALES—see Appendix, note 163), AND TO THE BLADDER (ARTERIA VESICALIS INFERIOR)—i.e., THE INFERIOR VESICAL, VAGINAL, OR VESICOVAGINAL ARTERY (IN THIS SPECIMEN ARISING FROM THE UTERINE ARTERY, INSTEAD OF, AS USUALLY, ARISING SEPARATELY FROM THE ANTERIOR DIVISION OF THE INTERNAL ILIAC ARTERY—see Appendix, note 163); THE INTERNAL PUDIC ARTERY, ARTERIA PUDENDA INTERNA, AND ITS OFFSETS TO THE VAGINA (see Appendix, note 163). THE PELVIC PORTION OF THE URETER, AND ITS RELATIONS TO THE UTERINE ARTERY, THE CERVIX UTERI, THE VAGINA, AND THE URINARY BLADDER.

By a frontal section passing on each side through the great sacrosacral foramen, the posterior wall of the pelvis was removed, in order to display (after removing the rectum) the uterus and the vagina, and, in addition, the lateral parts of the bladder. The uterus and the vagina were drawn upwards, the ovaries upwards and forwards; the lower layer of the mesovarium and the hinder layer of the mesometrium were removed, and the ureters, thus exposed, were preserved as nearly as possible in their natural position. The right internal iliac artery was drawn outwards and backwards, to display more fully the origin of its branches and that of the obliterated hypogastric artery (see note 1 above). The branches of the posterior division of the artery have been cut away near their origin, and the internal pudic artery has on both sides been traced as far as its passage through the small sacrosacral foramen.

ARTERIÆ COLLI ET CAPITIS

THE ARTERIES OF THE HEAD
AND NECK

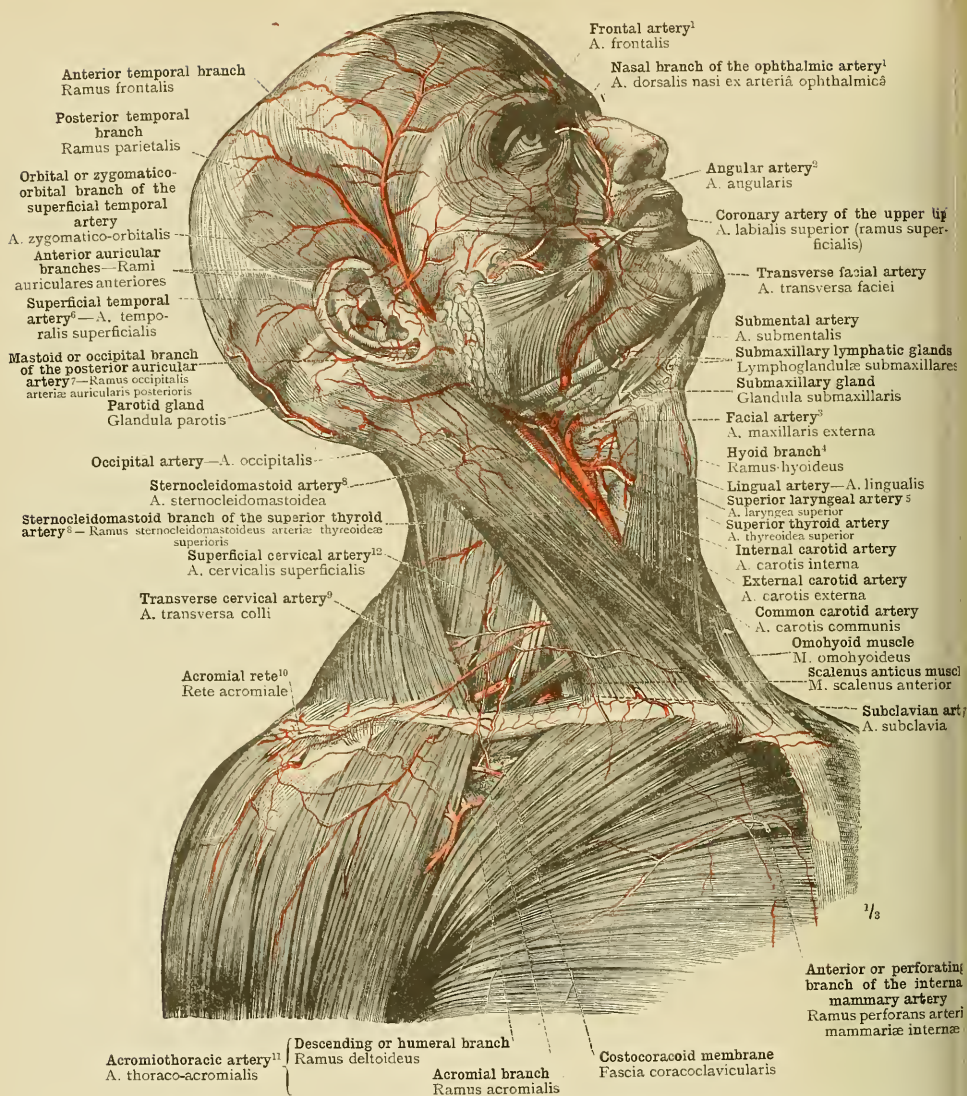


FIG. 998.—SUPERFICIAL ARTERIES OF THE HEAD AND NECK, AND OF THE UPPER PART OF THE PECTORAL REGION AND THE SHOULDER; SEEN FROM THE RIGHT SIDE.

Over the anterior part of the parotid gland, the parotideomasseteric fascia has been left intact. The lower ends of the levator labii superioris alaeque nasi, levator labii superioris proprius, and zygomaticus minor muscles have been removed, to display the facial artery and the origin of the coronary artery of the upper lip.

The Superficial Branches of the External Carotid, Subclavian, and Axillary Arteries.

¹ See Appendix, note 164.

² See Appendix, note 165.

³ See Appendix, note 166.

⁴ See Appendix, note 167.

⁵ Or laryngeal branch of the superior thyroid artery.

⁶ See Appendix, note 169.

⁷ Called by Macalister the posterior terminal branch of the posterior auricular artery.

⁸ Or posterior scapular artery (Macalister). See Appendix, note 172.—Tr.

⁹ Called by Macalister the thoraco-acromial artery.

¹⁰ See Appendix, note 169.

¹¹ See Appendix, note 170.

¹² See Appendix, note 171.

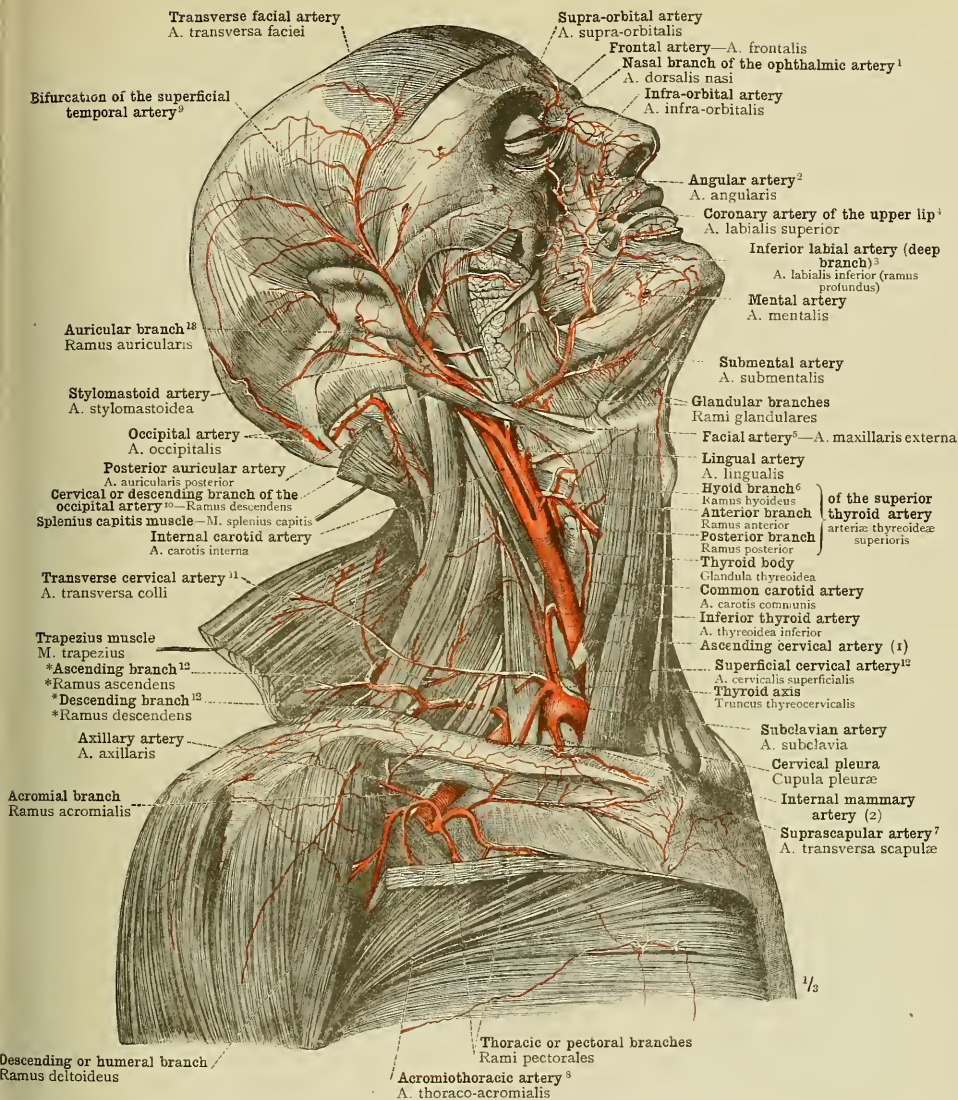
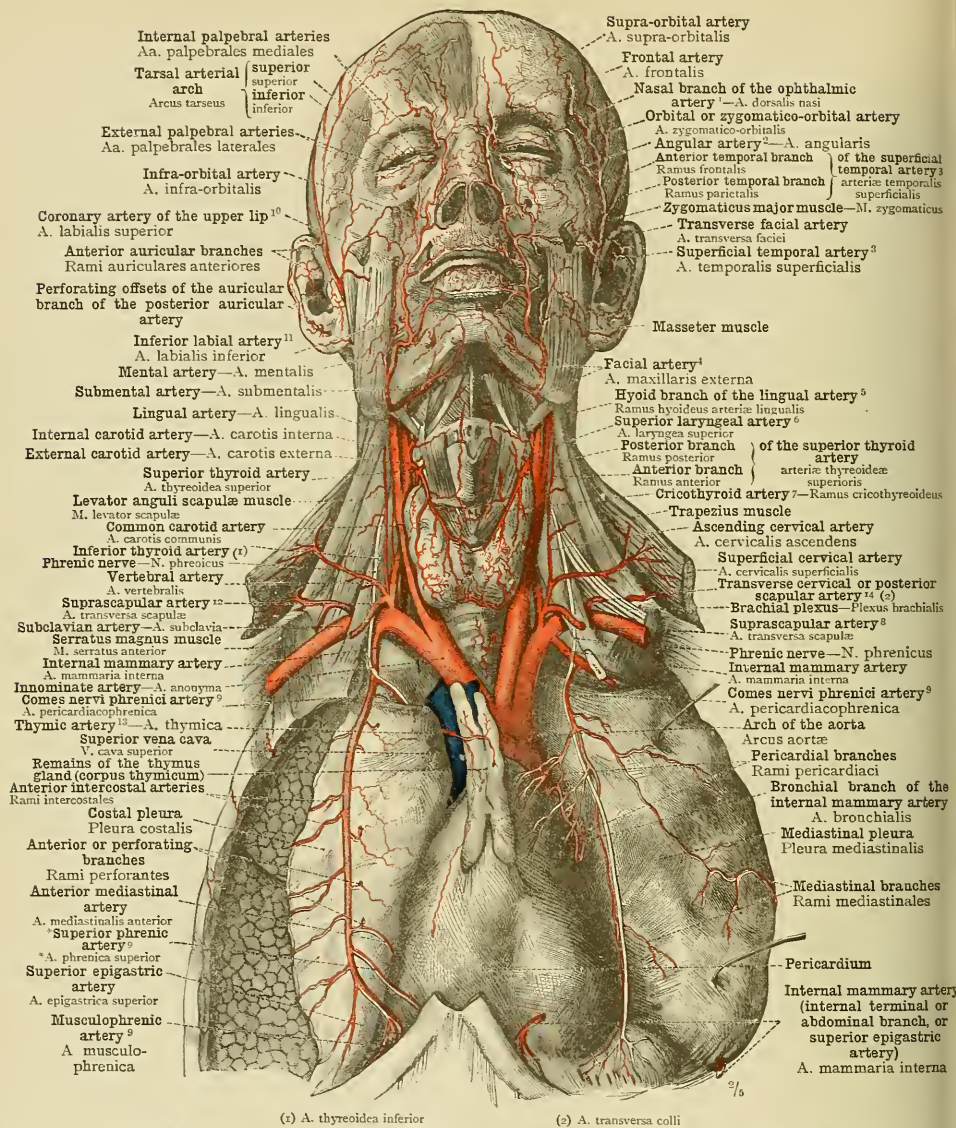
¹ See Appendix, note 164.² See Appendix, note 165.³ See Appendix, note 171.⁴ Called by Macalister the superior coronary artery.⁵ See Appendix, note 166.⁶ Called by Macalister the infrahyoidcan artery.⁷ Known also as the transverse scapular or transverse humeral artery.⁸ Called by Macalister the thoraco-acromial artery.⁹ See Appendix, note 168.¹⁰ Known also as the ramus cervicalis princeps, or arteria princeps cervicis.¹¹ Or posterior scapular artery (Macalister).¹² See Appendix, note 172.¹³ Called by Macalister the anterior terminal branch of the posterior auricular artery.

FIG. 999.—IN THE PREPARATION SHOWN IN FIG. 998, THE SUPERFICIAL MUSCLES OF THE FACE, THE HINDER PART OF THE PAROTID GLAND, THE SUBMAXILLARY GLAND, THE STERNOCLEIDOMASTOID MUSCLE, THE INFERIOR (POSTERIOR) BELLY OF THE OMOHYOID MUSCLE, THE UPPER PART OF THE CLAVICULAR PORTION OF THE PECTORALIS MAJOR MUSCLE, AND THE DEEP LAYER OF THE PECTORAL FASCIA, WERE REMOVED. THE ORBICULARIS ORIS MUSCLE WAS INCISED ABOVE AND BELOW THE APERTURE OF THE MOUTH (RIMA ORIS) AND PARALLEL WITH THAT APERTURE, THE INCISION PENETRATING TO THE LABIAL GLANDS, IN ORDER TO EXPOSE THE CORONARY ARTERIES OF THE LIPS.



(1) A. thyreoidica inferior

(2) A. transversa colli

¹ See Appendix, note 164.² See Appendix, note 165.³ See Appendix, note 163.⁴ See Appendix, note 166.⁵ Called by Macalister the *suprathyroidic artery*. See Appendix, note 167.⁶ Or *laryngeal branch of the superior thyroid artery*.⁷ See Appendix, note 173.⁸ Known also as the *transverse scapular* or *transverse humeral artery*.⁹ See Appendix, note 174.¹⁰ Called by Macalister the *superior coronary artery*.¹¹ See Appendix, note 172.¹² See Appendix, note 175.¹³ See Appendix, note 175.¹⁴ See Appendix, note 177.

FIG. 1000.—ON THE RIGHT SIDE OF THE BODY, THE COSTAL PLEURA AND THE LUNG HAVE BEEN PUSHED SOMEWHAT BACKWARDS; AND BETWEEN THE INTERNAL MAMMARY ARTERY AND THE ANTERIOR CUT SURFACES OF THE RIBS THE COSTAL PLEURA HAS BEEN REMOVED, EXPOSING THE SURFACE OF THE LUNG. THE LEFT LAYER OF THE MEDIASTINUM HAS BEEN SEPARATED FROM ITS ATTACHMENTS AS FAR BACK AS THE ROOT OF THE LUNG, AND HAS BEEN DRAWN OUTWARDS WITH THAT ORGAN.

The Distribution of the Branches of the Arch of the Aorta in the Head and Neck, and the Distribution of the Internal Mammary Artery.

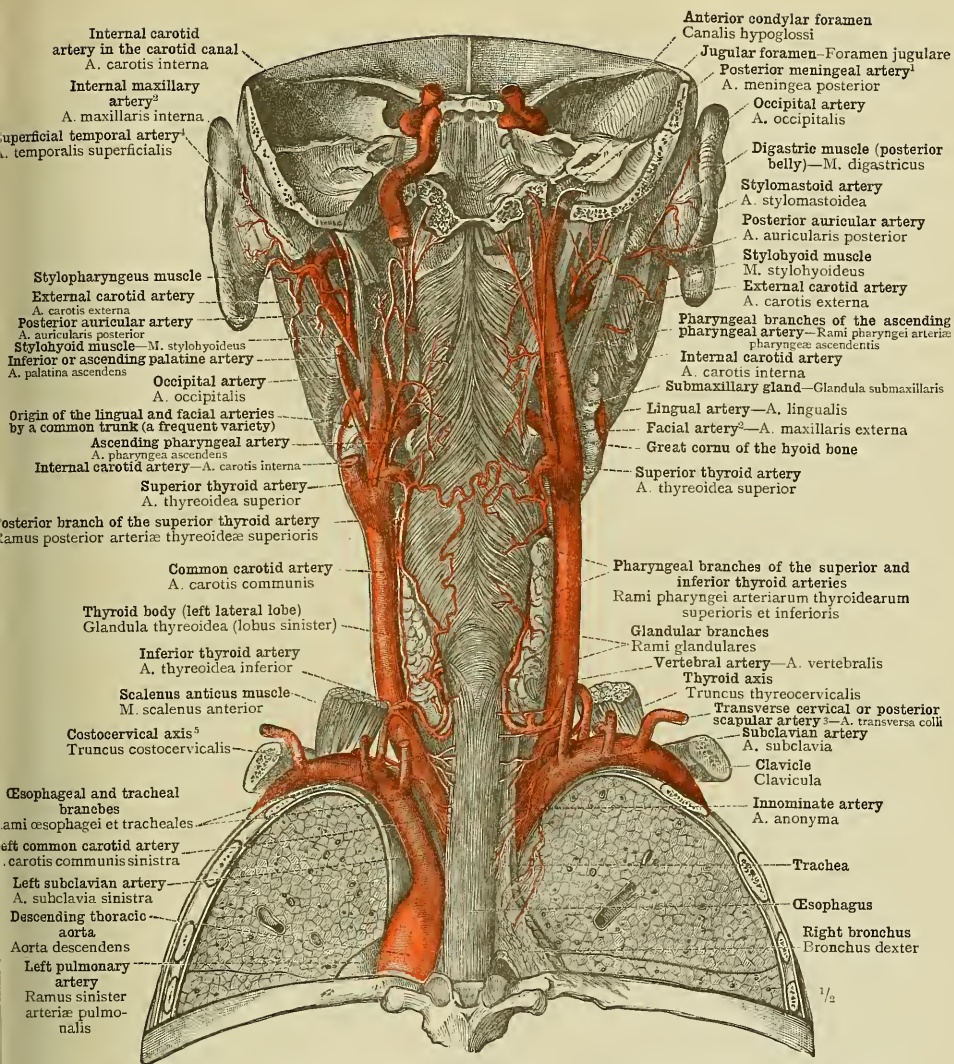
¹ See Appendix, note 176.² See Appendix, note 166.³ See Appendix, note 172.⁴ See Appendix, note 168.⁵ See Appendix, note 177.

FIG. 1001.—THE BRANCHES OF THE ARCH OF THE AORTA AND THE ARTERIES OF THE NECK, SEEN FROM BEHIND. THE ARTERIES OF THE PHARYNX: THE ASCENDING PHARYNGEAL ARTERY, ARTERIA PHARYNGEA ASCENDENS, ITS PHARYNGEAL BRANCHES, RAMI PHARYNGEI, AND ITS MENINGEAL BRANCH (see Appendix, note 176), ARTERIA MENINGEA POSTERIOR, TO THE HINDER PART OF THE DURA MATER; THE PHARYNGEAL BRANCHES, RAMI PHARYNGEI, OF THE SUPERIOR AND INFERIOR THYROID ARTERIES; THE (ESOPHAGEAL AND TRACHEAL BRANCHES, RAMI (ESOPHAGEI ET TRACHEALES, OF THE INFERIOR THYROID ARTERY.

Arteria subclavia, the subclavian artery, arteria carotis communis, the common carotid artery, arteria carotis interna, the internal carotid artery; the arteries of the pharynx, the trachea, and the œsophagus.

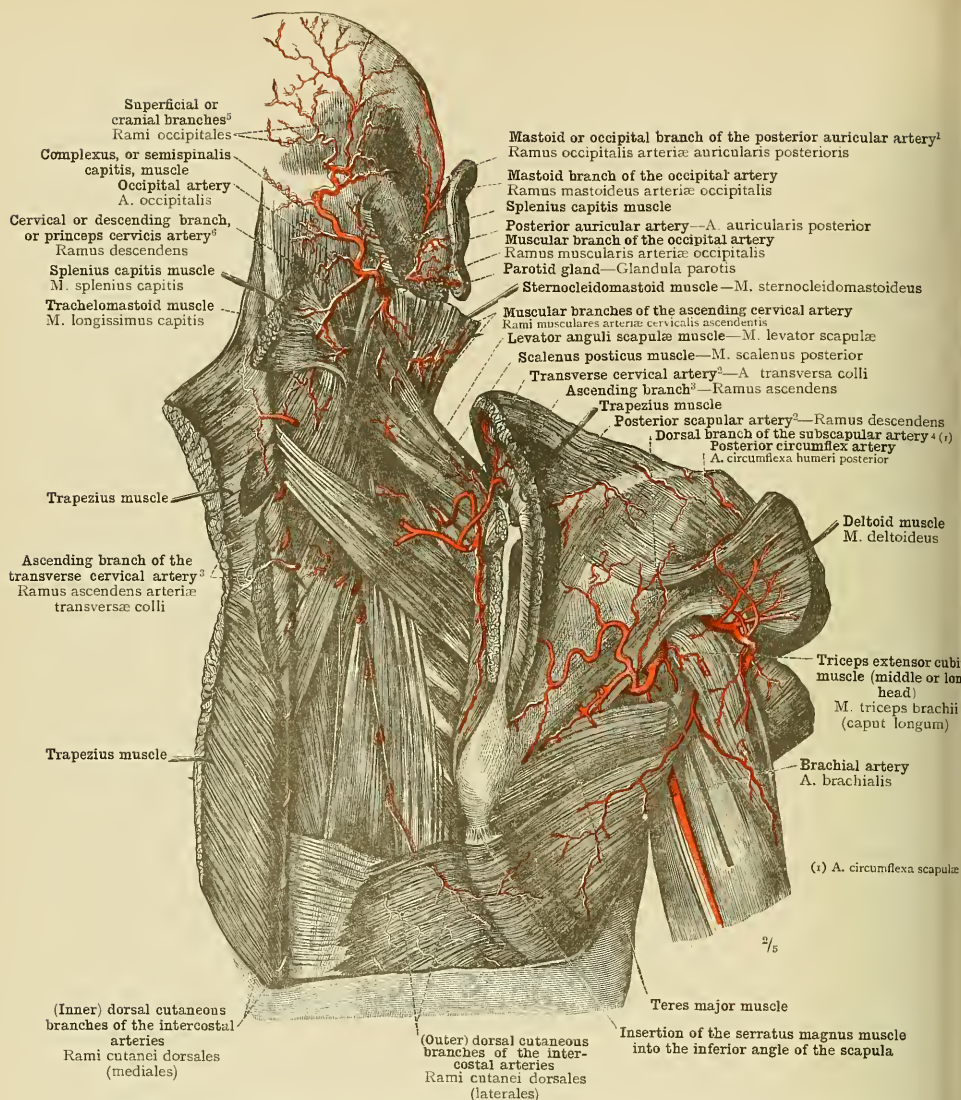


FIG. 1002.—THE DEEP ARTERIES OF THE RIGHT NUCHAL REGION AND THE BACK OF THE RIGHT SHOULDER; SEEN FROM BEHIND.

The scapula was drawn a little away from the trunk; a horizontal incision was made through the posterior half of the deltoid muscle a little above the middle of its vertical extent, and the muscle was turned forwards; the teres major muscle was drawn somewhat downwards. The superficial offsets only of the dorsal branch of the subscapular artery (dorsalis scapulae artery—arteria circumflexa scapulae) are seen, on the surface of the infraspinatus fascia; the deeper branches of this artery, ramifying beneath the infraspinatus muscle, are shown in Fig. 1010.

Arteria occipitalis, the occipital artery; arteria transversæ colli, the transverse cervical (or posterior scapular) artery; arteria circumflexa scapulae, the dorsal branch of the subscapular or dorsalis scapulae artery; and arteria circumflexa humeri posterior, the posterior circumflex artery (of the arm).

² Called by Macalister the *posterior terminal branch of the posterior auricular artery*.

³ In Macalister's terminology this is the *cervical branch of the transverse cervical or posterior scapular artery*.

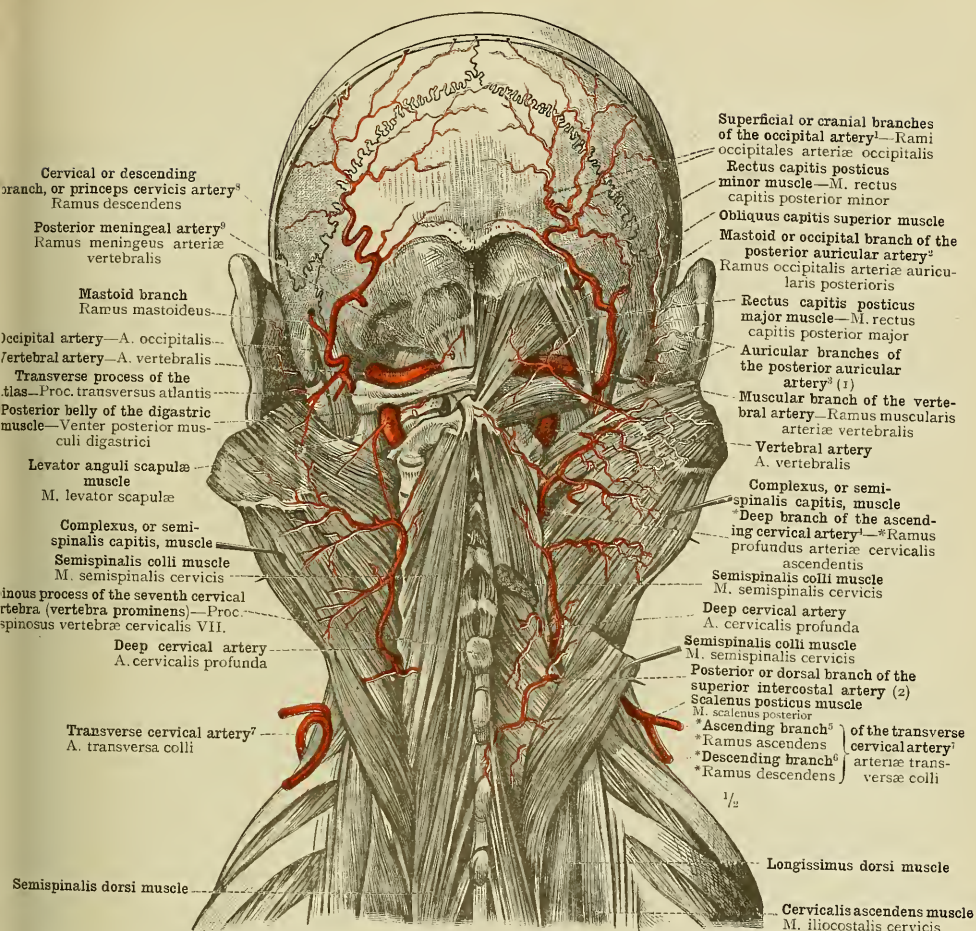
⁴ Commonly known in England as the *dorsalis scapulae artery*.

⁵ Called by Macalister the *external and internal terminal branches of the occipital artery*.

⁶ Or *ramus cervicis princeps arteria occipitalis*.

² See Appendix, note 172.

³ See Appendix, note 172.



(1) Rami auriculares arteriae auricularis posterioris

(2) Ramus dorsalis arteriae intercostalis supræmæ

¹ Called by Macalister the external and internal terminal branches of the occipital artery.² Called by Macalister the posterior terminal branch of the posterior auricular artery.³ The branch of the posterior auricular artery from which these offshoots are derived is called by Macalister the anterior terminal branch.⁴ See Appendix, note 178.⁵ Called by Macalister the cervical branch of the transverse cervical or posterior scapular artery. See Appendix, note 172.⁶ The posterior scapular artery of English anatomists. See Appendix, note 172.⁷ Transverse cervical or posterior scapular artery, according to Macalister. See Appendix, note 172.⁸ Or ramus cervicalis princeps arteriae occipitalis.⁹ See Appendix, note 176.

FIG. 1003.—THE ARTERIES OF THE OCCIPITAL REGION, AND THE DEEPEST ARTERIES OF THE NUCHAL REGION. ON THE LEFT SIDE, THE COMPLEXUS OR SEMISPINALIS CAPITIS MUSCLE IS SUPPLIED BY THE DEEP CERVICAL ARTERY; ON THE RIGHT SIDE, HOWEVER, THIS MUSCLE IS FURNISHED WITH BLOOD BY A LARGE MUSCULAR OFFSET OF THE ASCENDING CERVICAL ARTERY, KNOWN AS THE DEEP BRANCH, RAMUS PROFUNDUS (see Appendix, note 178). THE RIGHT TRANSVERSE CERVICAL ARTERY (see note 7 above) PERFORATES THE SCALENUS POSTICUS MUSCLE: THIS IS A FREQUENT VARIETY.

In the preparation shown in Fig. 1002, the complexus or semispinalis capitis muscle was separated on each side from its attachment to the skull, and turned outwards. On the right side, the semispinalis colli was cut across a little above the middle of its vertical extent, and the lower segment was drawn outwards, in order to display the passage of the deep cervical artery between the transverse processes of the seventh cervical and first dorsal vertebra. On the left side, the rectus capitis posticus major, rectus capitis posticus minor, obliquus capitis superior, and obliquus capitis inferior muscles have been removed, and the vertebral artery has thus been fully exposed both above and below the atlas.

Arteriæ cervicalis profunda, vertebralis et occipitalis—The deep cervical, vertebral, and occipital arteries.

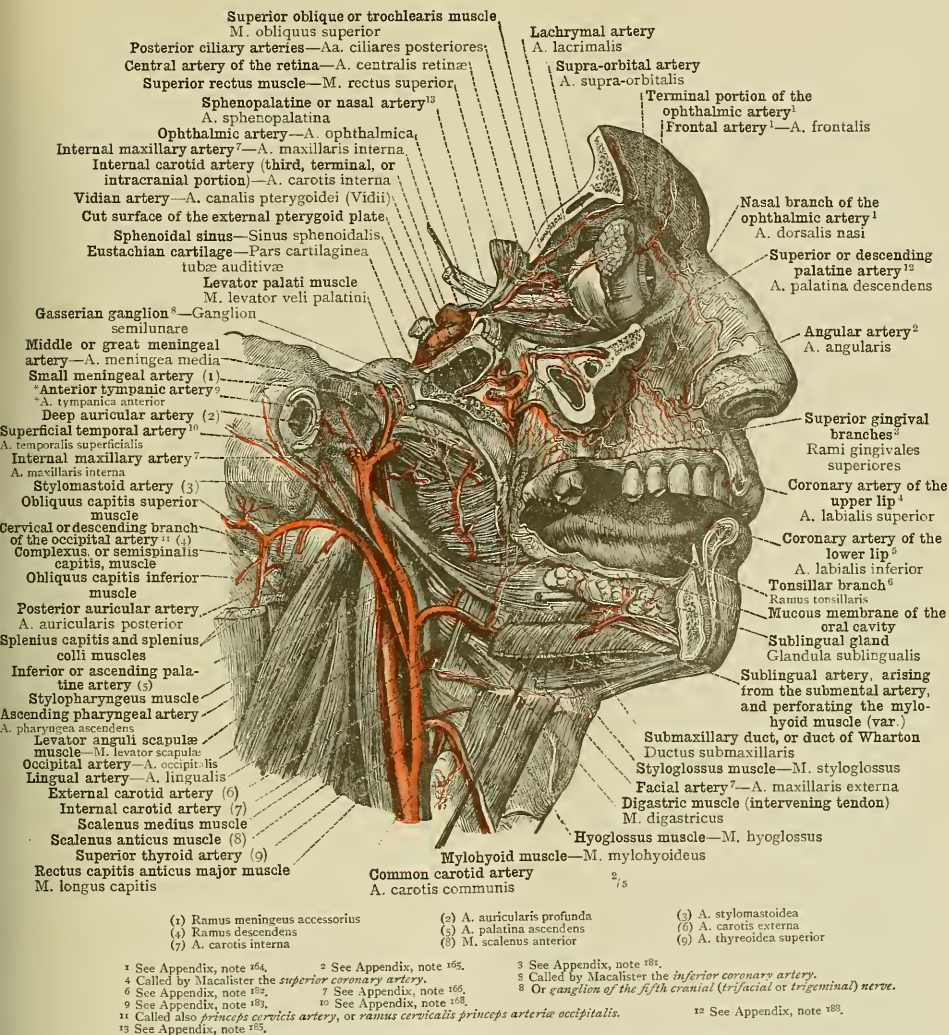


FIG. 1005.—THE ARTERIES OF THE ORBIT, THE TERMINAL BRANCHES OF THE INTERNAL MAXILLARY ARTERY, THE ARTERIES OF THE PHARYNX, AND THE ARTERIES OF THE SUBLINGUAL REGION; SEEN FROM THE RIGHT SIDE.

In the preparation shown in Fig. 1004, the right half of the mandible was removed as far forward as the attachment of the digastric muscle, together with the external and internal pterygoid muscles and the second (middle) part of the internal maxillary artery, and by turning down the mylohyoid muscle the sublingual gland was exposed. By a sagittal section, which opened the infra-orbital canal, the outer half of the orbit was removed, the contents of the cavity, however, being preserved. By a section which opened the anterior part of the Vidian or pterygoid canal, the right sphenoidal sinus, the foramen rotundum, the foramen ovale, and the foramen spinosum, the greater part of the floor of the middle cranial fossa was removed, and, after the external pterygoid plate with the circumflexus or tensor palati muscle had been cut away, the origin of the branches of the third (terminal) part of the internal maxillary artery in the sphenomaxillary fossa was displayed.

A. maxillaris interna, the internal maxillary artery; a. ophthalmica, the ophthalmic artery; a. pharyngea ascendens, the ascending pharyngeal artery; a. palatina ascendens, the inferior or ascending palatine artery; a. sublingualis, the sublingual artery.

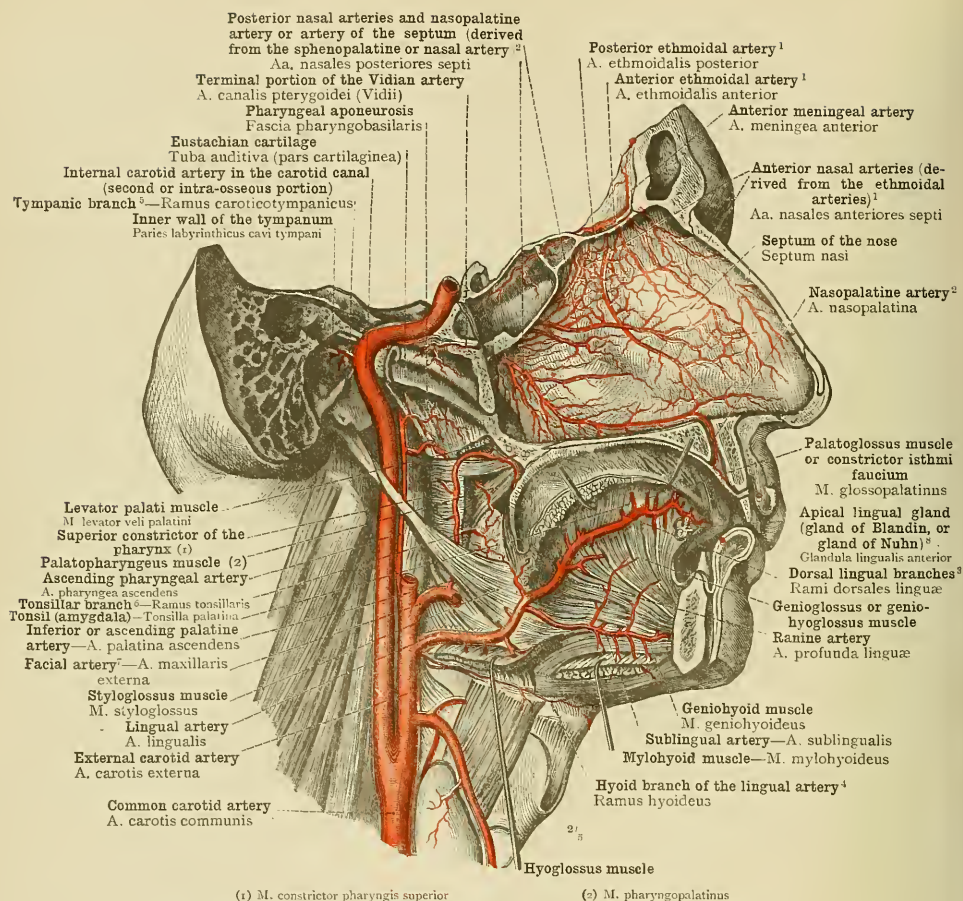
¹ See Appendix, note 184.² See Appendix, note 185.³ See Appendix, note 185.⁴ Called by Macalister the *suprahyoidean artery*.⁵ See Appendix, note 187.⁶ See Appendix, note 185.⁷ See Appendix, note 166.⁸ See note 7 to p. 420 in Part IV.

FIG. 1006.—ARTERIES OF THE NASAL SEPTUM, THE TONGUE, AND THE PHARYNX; SEEN FROM THE RIGHT SIDE.

In the preparation shown in Fig. 1005, by a sagittal section passing a little to the right of the median plane, the right side of the septum of the nose was exposed; by a section somewhat further to the right, the lower part of the internal pterygoid plate was removed, and the Vidian or pterygoid canal was opened up to its posterior orifice. By means of a section passing through the temporal bone itself, the direction of which was nearly that of the axis of the petrous portion of the temporal bone, the middle ear was opened, and also the carotid canal, by the removal of its outer wall. The posterior extremity of the Eustachian cartilage was cut away, the levator palati muscle was removed just above the point at which it enters the soft palate, and the pharyngeal aponeurosis was laid bare down to the upper border of the superior constrictor of the pharynx. By the removal of the anterior portion of this muscle, the outer surface of the tonsil (amygdala) was exposed. By the partial removal of the hyoglossus muscle and by drawing its lower segment downwards, the lingual artery was laid bare; and by the partial removal of the intrinsic muscular substance of the tongue, the ranine artery was brought into view.

Arteries of the septum of the nose. A. lingualis, the lingual artery. Aa. pharyngea et palatina ascendens, the ascending pharyngeal and ascending palatine arteries. A. carotis interna, the internal carotid artery.

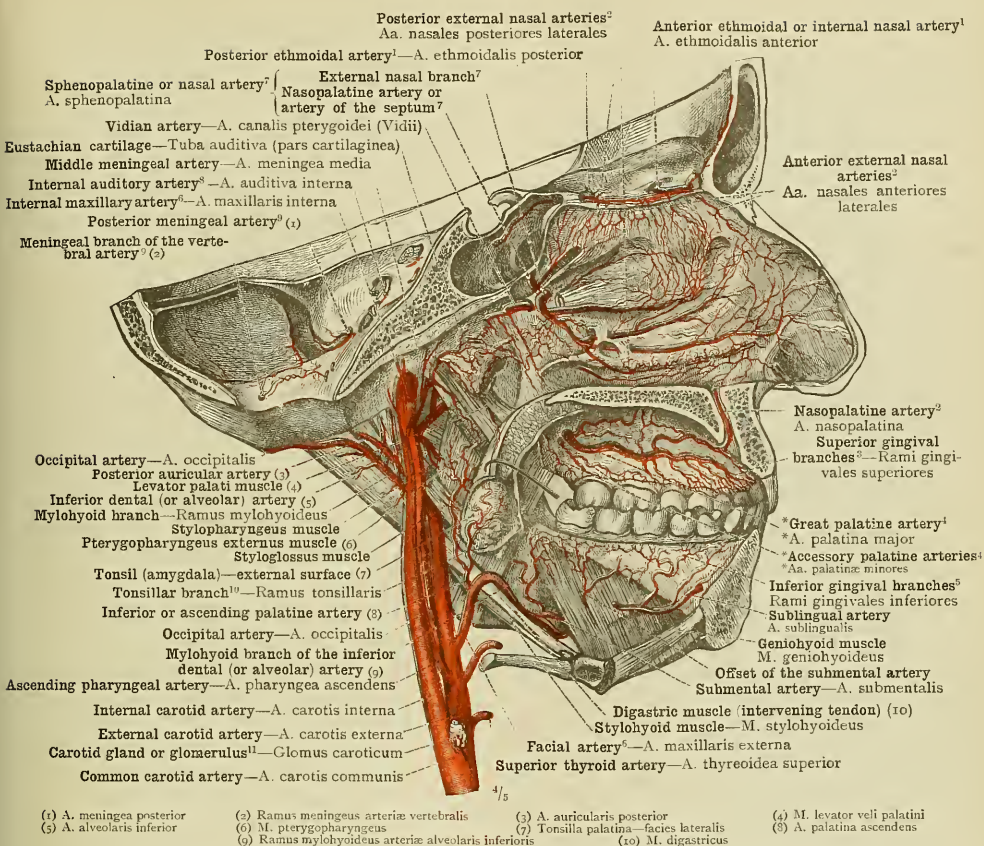


FIG. 1007.—THE ARTERIES OF THE EXTERNAL WALL OF THE NASAL FOSSÆ, OF THE CARTILAGINOUS PORTION OF THE EUSTACHIAN TUBE, OF THE HARD PALATE, OF THE TONSIL (AMYGDALA), AND OF THE EXTERNAL WALL OF THE MOUTH; THE SMALLER MENINGEAL ARTERIES; THE INTERNAL CAROTID ARTERY, THE EXTERNAL CAROTID ARTERY AND ITS BRANCHES. LEFT HALF OF THE HEAD SEEN FROM THE INNER SIDE.

By a sagittal section passing a little to the left of the median plane, the right half of the head was removed, the spinal column having first been cut away. After the pharynx had been removed, the left external and internal carotid arteries, as well as the branches of the former artery, were exposed from within. The left half of the soft palate and the left tonsil (amygdala) were retained, the latter being drawn a little forward, in order to display the ramification on its surface of the offsets of the tonsillar branch of the ascending palatine artery. Behind the levator palati muscle, a narrow strip of the pterygopharyngeus externus muscle was preserved. The posterior extremity of the middle turbinate bone was removed, in order to expose the lower posterior external nasal branch of the sphenopalatine or nasal artery. In the oral cavity, the tongue and the sublingual gland were removed, the mylohyoid and geniohyoid muscles as well as the anterior portion of the sublingual artery being preserved, and the inferior gingival branches were exposed, springing from the sublingual artery, from a perforating offset of the submental artery, and from the mylohyoid branch of the inferior dental (or alveolar) artery.

Arteries of the external wall of the nasal fossæ: A. pterygopalatina, the superior or descending palatine artery. A. canalis pterygoidei, the Vidian artery. Aa. pharyngea et palatina ascendens, the ascending pharyngeal and the inferior or ascending palatine artery.

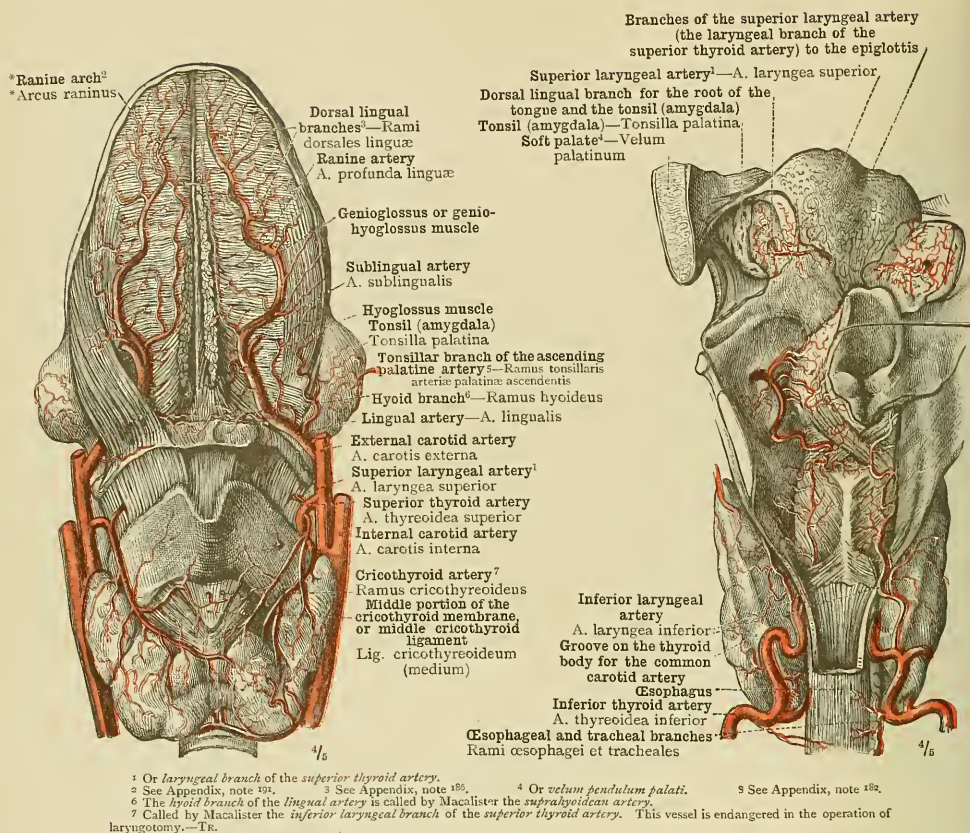


FIG. 1008.—THE TONGUE, THE LARYNX, AND THE THYROID BODY, SEEN FROM THE VENTRAL SIDE. THE RAMIFICATION OF THE RANINE ARTERY, ARTERIA PROFUNDA LINGUÆ, AND THE TRANSVERSE ANASTOMOSIS BETWEEN THE TWO RANINE ARTERIES, KNOWN AS THE *RANINE ARCH, *ARCUS RANINUS (see Appendix, note 191); THE LINGUAL ARTERY, ARTERIA LINGUALIS, WITH ITS HYOID BRANCH, RAMUS HYOIDEUS (see note 6 above); THE ARTERIES OF THE TONSIL (AMYGDALA), TONSILLA PALATINA; THE SUPERIOR THYROID ARTERY, ARTERIA THYROIDEA SUPERIOR, WITH THE SUPERIOR LARYNGEAL ARTERY, ARTERIA LARYNGEA SUPERIOR (see note 1 above), AND THE CRICOTHYROID ARTERY, RAMUS CRICOTHYROIDEUS (see note 7 above).

In the right half of the tongue the hyoglossus muscle has been preserved; in the left half it has been removed, and the left lingual artery has thus been fully exposed. The sublingual artery sublingualis, has been cut away on both sides close to its origin; the dorsal lingual branches have been traced for a considerable distance by the partial removal of the intrinsic muscular substance of the tongue.

FIG. 1009.—THE ROOT OF THE TONGUE, THE LARYNX, AND THE LARYNGEAL PORTION OF THE PHARYNX, WITH THE ADJOINING PORTION OF THE OESOPHAGUS AND THE THYROID BODY; SEEN FROM THE DORSAL SIDE.

After the posterior wall of the pharynx had been removed, the mucous membrane covering the left pyriform sinus and the anterior wall of the pharynx as far down as the commencement of the cesophagus was dissected off, and the superior and inferior laryngeal arteries were exposed. The epiglottis was drawn to the right, in order to display the offsets with which it is supplied by the superior laryngeal artery. On both sides the mucous membrane of the root of the tongue and of the tonsils was partially removed, in order to expose the site of emergence on the dorsum of the muscular substance of the tongue of the hindmost dorsal lingual branch, and the superficial ramification of that artery.

Arteries of the Tongue, the Larynx, the Tonsil (Amygdala), and the Thyroid Body.

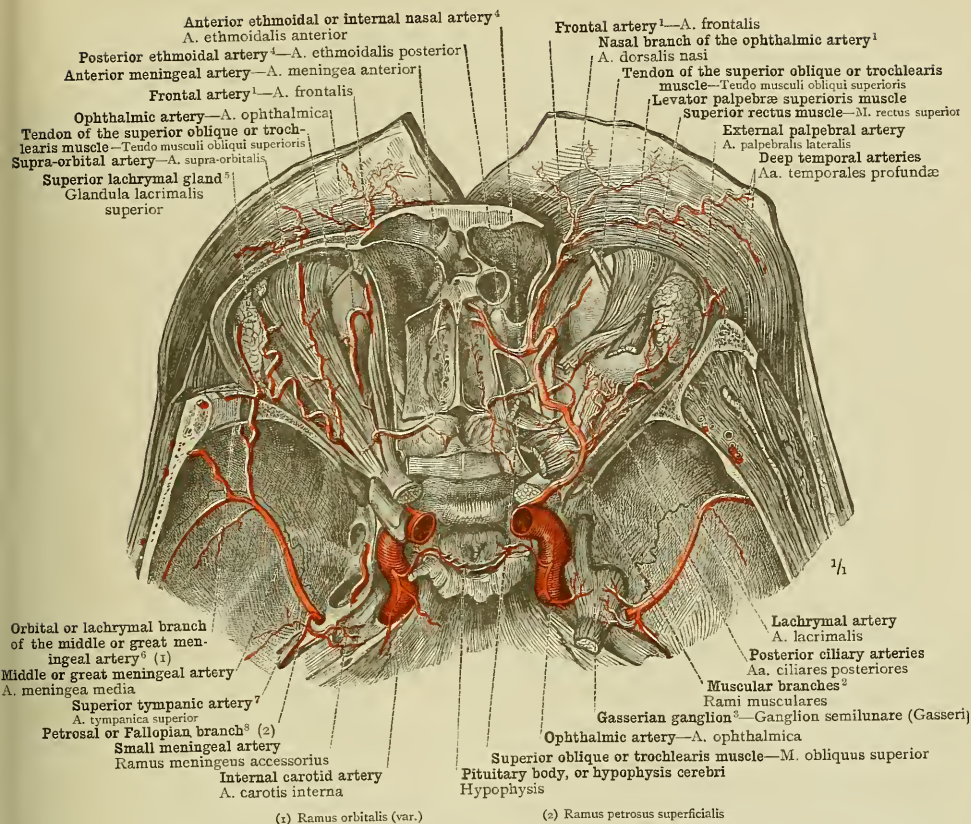
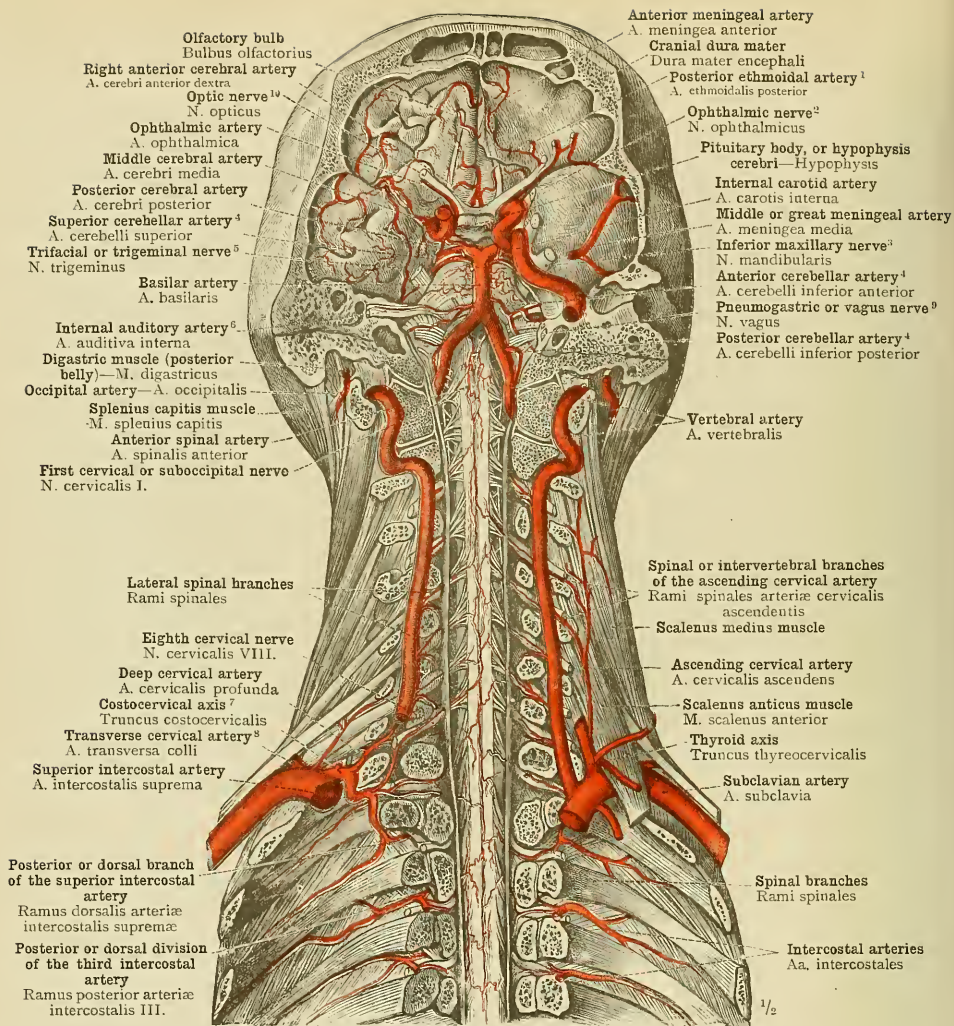
¹ See Appendix, note 164.⁴ See Appendix, note 184.⁸ See Appendix, note 183.² See Appendix, note 192.⁵ See Appendix, note 179.³ Or ganglion of the fifth cranial (trifacial or trigeminal) nerve.⁶ See Appendix, note 193.⁷ See Appendix, note 194.

FIG. 1010.—THE THIRD, TERMINAL, OR INTRACRANIAL PORTION OF THE INTERNAL CAROTID ARTERY, ARTERIA CAROTIS INTERNA, AND THE DISTRIBUTION OF THE OPHTHALMIC ARTERY, ARTERIA OPHTHALMICA; SEEN FROM ABOVE. THE MIDDLE MENINGEAL ARTERY SENDS AN OFFSET TO THE LACHRYMAL GLAND THROUGH THE OUTER WALL OF THE ORBIT (A COMMON VARIETY—see Appendix, note 193). ON THE LEFT SIDE, THE POSTERIOR ETHMOIDAL ARTERY IS LARGER THAN THE ANTERIOR ETHMOIDAL, AND CROSSES ABOVE (INSTEAD OF BELOW) THE SUPERIOR OBLIQUE OR TROCHLEARIS MUSCLE (VAR.).

The roof of the right orbit, and the roof and the upper part of the outer wall of the left orbit, were removed. The scalp having been separated from the subjacent squamous portion of the frontal bone and turned forwards and a little downwards, the branches of the ophthalmic artery, arteria ophthalmica, emerging from beneath the orbital arch or supra-orbital margin, margo supra-orbitalis, were exposed: these branches are, the supra-orbital artery, arteria supra-orbitalis; the frontal artery, arteria frontalis; and the nasal branch, arteria dorsalis nasi (see Appendix, note 164). On the right side, the levator palpebrae superioris muscle, the superior rectus muscle, and the superior oblique or trochlearis muscle were in part removed, and their proximal segments were turned backwards, in order to expose the entire course of the ophthalmic artery, arteria ophthalmica, its offsets to the orbital muscles, rami musculares (see Appendix, note 192), and to the eyeball, and the origin of the ethmoidal arteries (see Appendix, note 184). The right anterior ethmoidal or internal nasal artery was laid bare from its origin up to its point of emergence from the cranial cavity; by the partial removal of the roof of the sphenoidal sinus, its mucoperiosteum being left intact, the ramification in the substance of this membrane of the branches of the posterior ethmoidal artery was displayed.



¹ See Appendix, note 124.

² Or first division of the fifth cranial (trifacial or trigeminal) nerve.

³ Or third division of the fifth cranial (trifacial or trigeminal) nerve.

⁴ See Appendix, note 125.

⁵ Or fifth cranial nerve.

⁶ Called by Quain the auditory artery without qualification.

⁷ See Appendix, note 127.

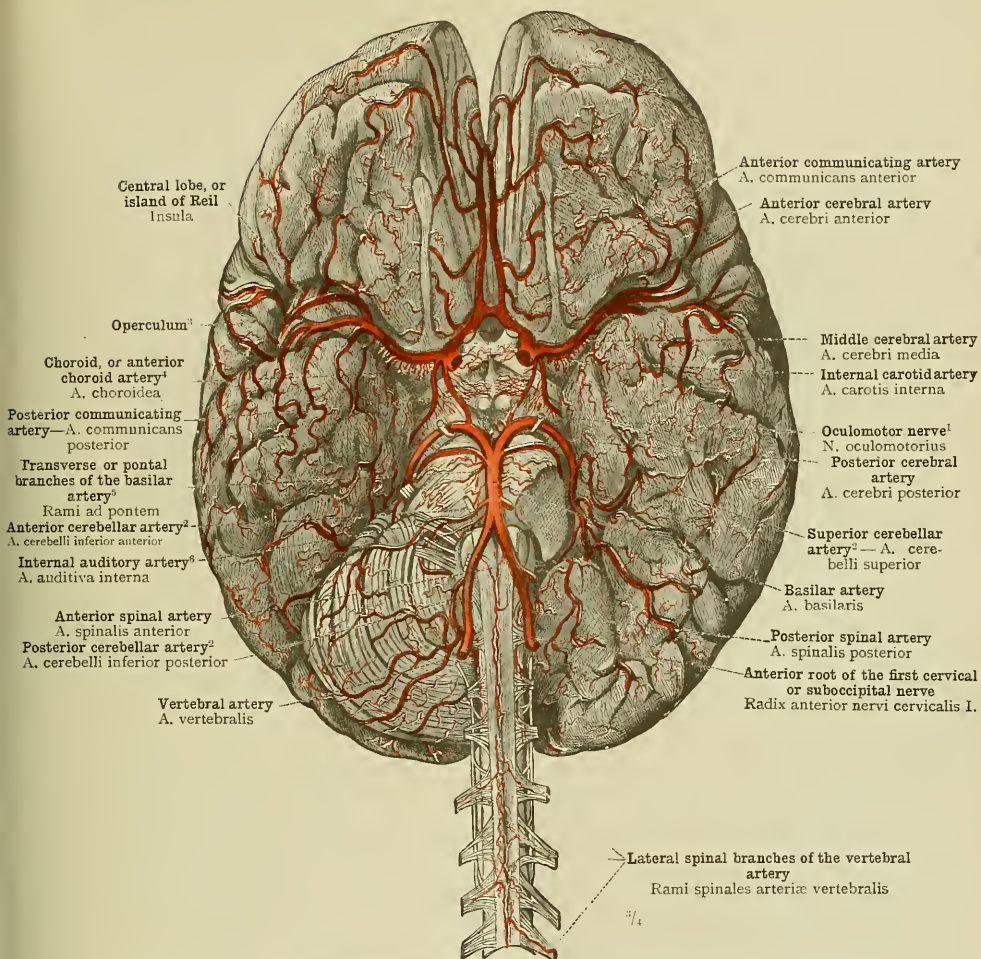
⁸ Or posterior scapular artery (Macalister); and see Appendix, note 127.

⁹ Or tenth cranial nerve, according to Soemmering's enumeration. (According to that of Willis, the *par vagum* of the eighth cranial nerve.)—T₁₀.

¹⁰ Or second cranial nerve.

FIG. 1011.—IN THE THORAX, THE BODIES OF THE VERTEBRÆ WITH THE HEADS OF THE RIBS HAVE BEEN REMOVED; IN THE NECK, THE BODIES OF THE VERTEBRÆ AND THE ANTERIOR LIMBS OF THE TRANSVERSE PROCESSES (*i.e.*, THE COSTAL PROCESSES), SO AS TO EXPOSE THE VERTEBRAL ARTERY, AND, AFTER CUTTING AWAY THE ANTERIOR PORTION OF THE SPINAL DURA MATER, THE SPINAL BRANCHES OF THE VERTEBRAL ARTERY AND THE SPINAL OR INTERVERTEBRAL BRANCHES OF THE ASCENDING CERVICAL ARTERY. IN THE HEAD, THE GREATER PART OF THE BASE OF THE SKULL HAS BEEN CUT AWAY, AND ON THE RIGHT SIDE THE EXPOSED PORTION OF THE CRANIAL DURA MATER HAS ALSO BEEN REMOVED, SO AS TO LAY BARE THE ARTERIES OF THE BASE OF THE BRAIN. SEEN FROM BEFORE. THE INTERNAL AUDITORY ARTERY, ARTERIA AUDITIVA INTERNA (*see note ⁶ above*), ARISES IN THIS SPECIMEN FROM THE ANTERIOR CEREBELLAR ARTERY, ARTERIA CEREBELLI INFERIOR ANTERIOR (*see Appendix, note ¹⁰⁰*), INSTEAD OF, AS NORMALLY, DIRECTLY FROM THE BASILAR ARTERY. THIS IS A COMMON VARIETY.

A. vertebralis, the vertebral artery. A. basilaris, the basilar artery. A. carotis interna, the internal carotid artery.



¹ Or third cranial nerve. Sometimes distinguished from the fourth and the sixth cranial nerves as the common oculomotor nerve, and often spoken of as the motor oculi nerve.

³ See Appendix, note 196.

² See Appendix, note 195.

⁴ Distinguished as anterior choroid artery from the posterior choroid branch of the posterior cerebral artery, which is not mentioned by the author.—Trk.

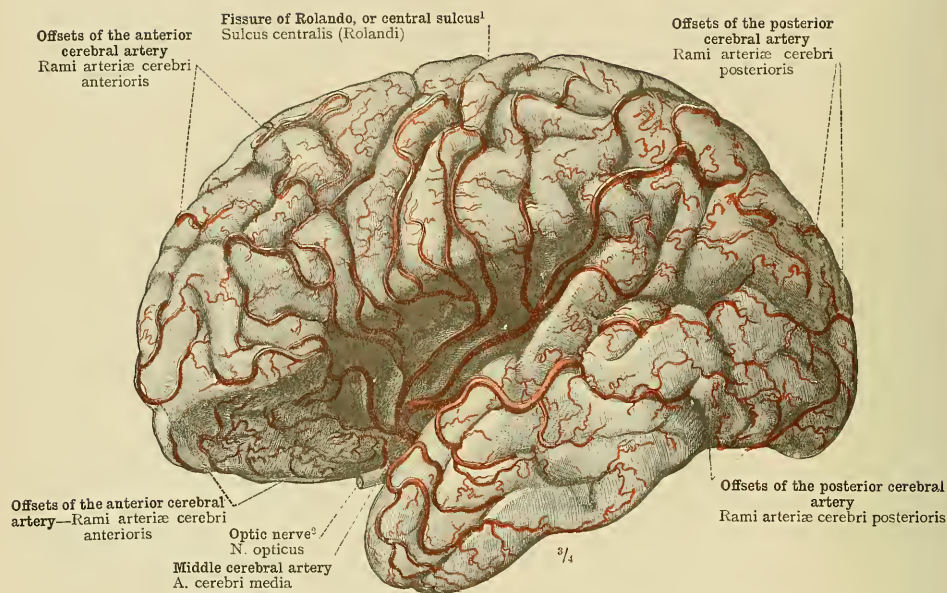
⁵ Or transverse arteries of the pons (Ellis, "Demonstrations of Anatomy").

⁶ Called by Quain the auditory artery without qualification.

FIG. 1012.—THE ARTERIES OF THE BASE OF THE BRAIN; THE CIRCLE OF WILLIS, CIRCULUS ARTERIOSUS (WILLISI).

The frontal lobes were drawn a little apart, in order to display the two anterior cerebral arteries as far as the genu of the corpus callosum; the right fissure of Sylvius, fissura cerebri lateralis dextra, was opened up to some extent, in order to trace the ramification of the middle cerebral artery. After the removal of the left hemisphere of the cerebellum, the ramification of the posterior cerebral artery on the basal (inferior) surface of the temporal and occipital lobes was exposed.

Arteries of the Brain.

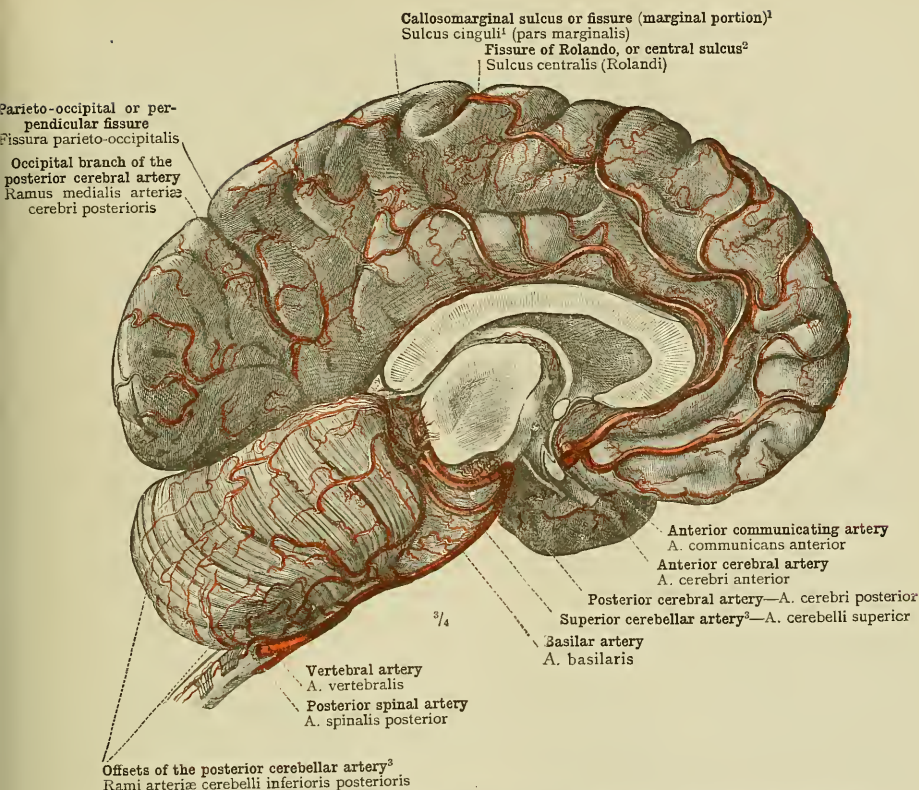


¹ *Fissure of Rolando.*—If the use of the term *fissure* be restricted, according to the usage of some authorities, to those sulci that involve the whole thickness both of the grey and the white substance of the cerebrum, and thus affect the form of the lateral ventricle or give rise to eminences projecting on its wall, the *central sulcus* does not come within that category. It is, on the other hand, one of the *primary sulci*, one of those that are already apparent in the sixth month of intra-uterine life; and, moreover, it is an *interlobar sulcus*, constituting the boundary on the outer surface of the hemisphere between the frontal and the parietal lobes. Hence it is usually distinguished by the title of *fissure*, and is seldom spoken of as the *furrow of Rolando*.—Tr.

² Or *second cranial nerve*.

FIG. 1013.—THE RAMIFICATION OF THE CEREBRAL ARTERIES, ARTERIÆ CEREBRI, ON THE CONVEX (OUTER) SURFACE OF THE LEFT CEREBRAL HEMISPHERE AND THE CENTRAL LOBE OR ISLAND OF REIL, AND ALSO ON THE BASAL (INFERIOR) SURFACE OF THE FRONTAL LOBE. THE LEFT HEMISPHERE OF THE CEREBRUM, SEEN FROM THE OUTER SIDE.

The fissure of Sylvius, *fissura cerebri lateralis* (Sylvii), was widely opened by the separation of the adjoining lobes of the cerebral hemisphere, in order to display the ramification of the middle cerebral artery, *arteria cerebri media*, at the bottom of the fissure.



¹ *Sulcus Cinguli*.—This term is not used by English anatomists. The callosal convolution, *gyrus fornicatus*, is in England sometimes termed *gyrus cinguli*, and this latter name is used by the author to distinguish what he calls the "upper portion of the *gyrus fornicatus*," the convolution on the inner (mesial) surface of the hemisphere immediately above the corpus callosum or great commissure. The *gyrus cinguli* is bounded above by the *sulcus cinguli*, the *callosomarginal sulcus* of English authors; and this is divided by Toldt into a *pars marginalis* and a *pars subfrontalis*, *marginal* and *subfrontal* portions, the terms being self-explanatory. The posterior portion was called by Wilder the *paracentral fissure*; the anterior portion, which is parallel with the genu of the corpus callosum, the *prelimbic fissure*.—Tn.

² See note ¹ to p. 624.

³ See Appendix, note 195.

FIG. 1014.—THE DISTRIBUTION OF THE ANTERIOR AND POSTERIOR CEREBRAL ARTERIES, ARTERIÆ CEREBRI ANTERIOR ET POSTERIOR, ON THE INTERNAL (MESIAL) SURFACE OF THE LEFT HEMISPHERE OF THE CEREBRUM; AND ALSO THE RAMIFICATION OF THE SUPERIOR AND POSTERIOR CEREBELLAR ARTERIES, ARTERIÆ CEREBELLI SUPERIOR ET INFERIOR POSTERIOR (see Appendix, note ¹⁹⁵), ON THE UPPER SURFACE OF THE RIGHT HEMISPHERE OF THE CEREBELLUM. THE POSTERIOR SPINAL ARTERY, ARTERIA SPINALIS POSTERIOR; THE VERTEBRAL ARTERY, ARTERIA VERTEBRALIS; AND THE BASILAR ARTERY, ARTERIA BASILARIS.

The corpus callosum or great commissure having been divided longitudinally in the median plane, the right hemisphere of the cerebrum was removed by a section passing through its peduncle (the right crus cerebri), in order to display the course and distribution of the anterior and posterior cerebral arteries, arteriæ cerebri anterior et posterior, and also to expose the branches of the posterior cerebral artery that enter the isthmus of the brain as well as those passing to the velum interpositum or tela choroidea superior (tela choroidea ventriculi tertii).

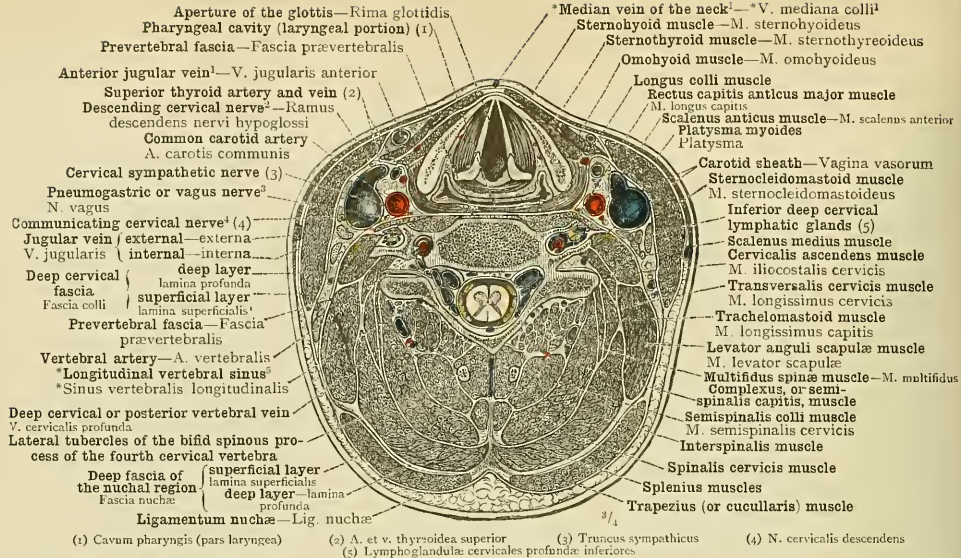


FIG. 1015.—TRANSVERSE SECTION THROUGH THE NECK, AT THE LEVEL OF THE APERTURE OF THE GLOTTIS, AND PASSING THROUGH THE BODY OF THE FIFTH CERVICAL VERTEBRA; UPPER SURFACE OF THE LOWER SEGMENT.

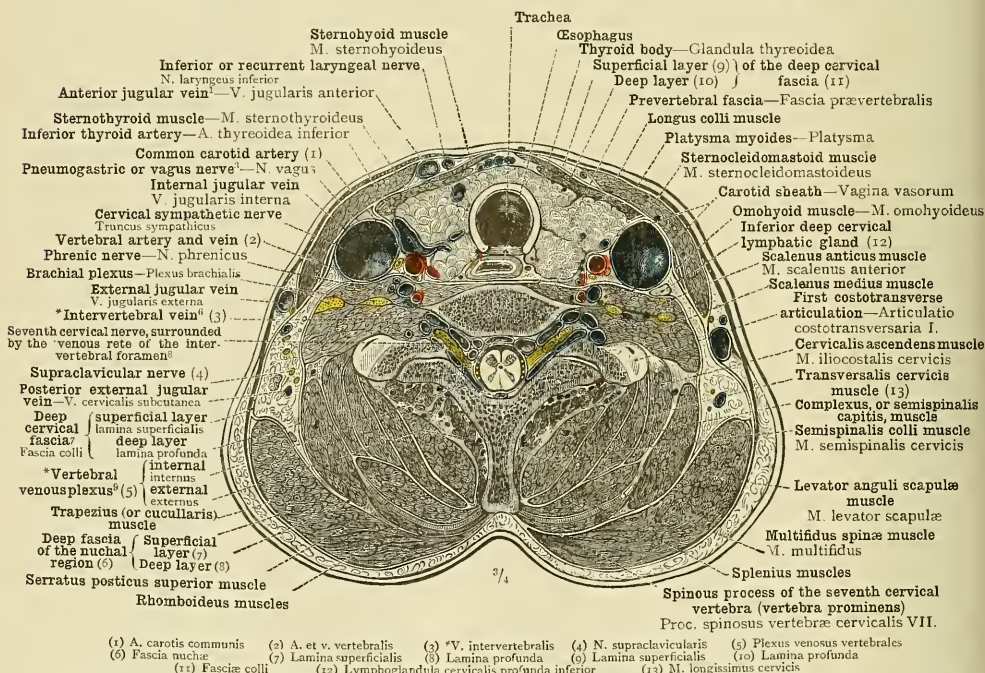


FIG. 1016.—TRANSVERSE SECTION THROUGH THE NECK, PASSING THROUGH THE SPINE NEAR THE LOWER SURFACE OF THE BODY OF THE SEVENTH CERVICAL VERTEBRA (VERTEBRA PROMINENS). UPPER SURFACE OF THE LOWER SEGMENT.

¹ See Appendix, note 197.

² See Appendix, note 198.

³ Or tenth cranial nerve, according to Soemmerring's enumeration. (According to that of Willis, the *par vagum* of the eighth cranial nerve)—Tr.

⁴ See Appendix, note 196.

⁵ See Appendix, note 200.

⁶ See Appendix, note 201.

⁷ See Appendix, note 202.

⁸ See note 5 to p. 667.

⁹ See note 1 to p. 665.

ARTERIÆ EXTREMITATUM
SUPERIORUM ET INFERIORUM

THE ARTERIES OF THE
UPPER AND LOWER EXTREMITIES

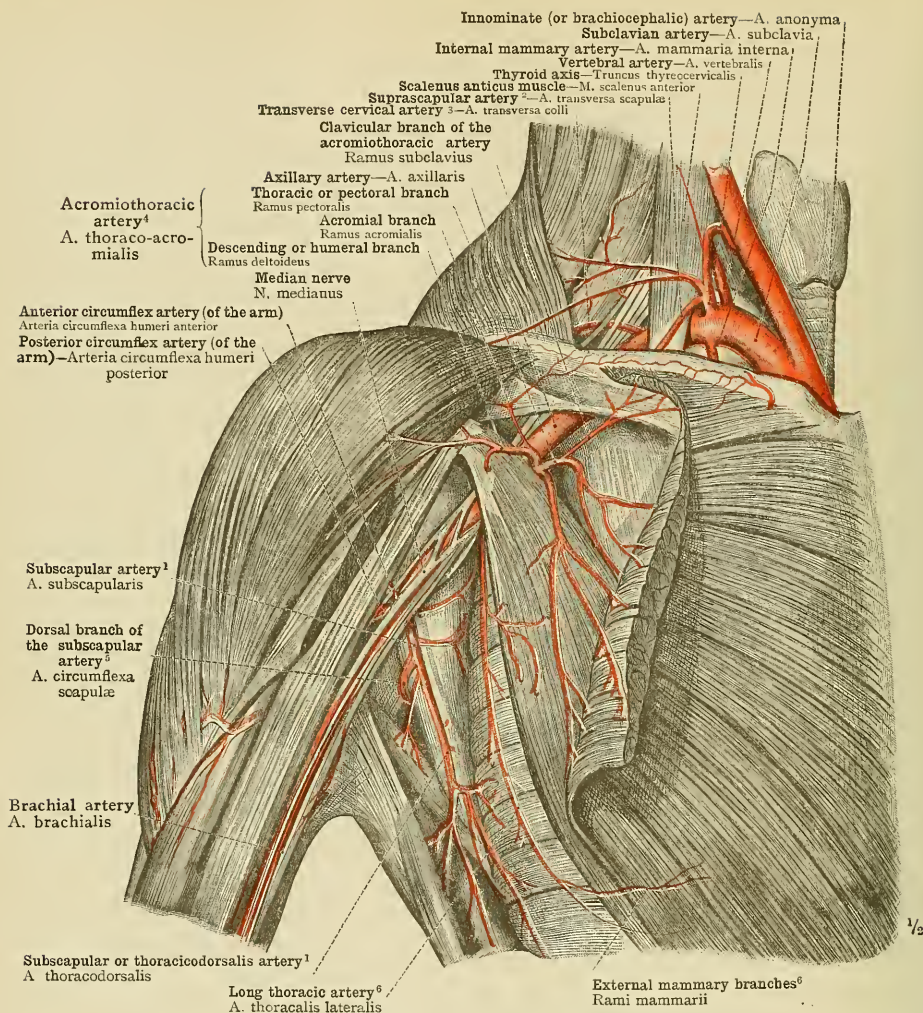
¹ See Appendix, note 203.² Known also as the *transverse scapular* or *transverse humeral* artery.³ Or *posterior scapular* artery (Macalister). See Appendix, notes 134, 135, 172, and 203.⁴ Called by Macalister the *thoraco-acromial* artery.⁵ Often called the *dorsalis scapulae* artery. See also Appendix, note 203.⁶ See Appendix, note 204.

FIG. 1017.—RIGHT SUBCLAVIAN AND AXILLARY ARTERIES AND THEIR RELATION TO THE BRACHIAL PLEXUS; SEEN FROM THE FRONT AND THE INNER SIDE. THE DIVISION OF THE INNOMINATE (OR BRACHIOCEPHALIC) ARTERY INTO RIGHT SUBCLAVIAN AND COMMON CAROTID ARTERIES. *THORACIC PORTION OF THE SUBCLAVIAN ARTERY (see Appendix, note 205), WITH THE ORIGIN OF THE VERTEBRAL ARTERY, THE THYROID AXIS, AND THE INTERNAL MAMMARY ARTERY; THE CERVICAL (THIRD) PORTION OF THE SUBCLAVIAN ARTERY (see Appendix, note 205), WITH THE ORIGIN OF THE TRANSVERSE CERVICAL ARTERY.

Of the branches of the axillary artery (see Appendix, note 205) we see: the branches of the acromiothoracic artery, arteria thoraco-acromialis, the thoracic or pectoral branch, ramus pectoralis, the clavicular branch, ramus subclavius, the acromial branch, ramus acromialis, and the descending or humeral branch, ramus deltoideus; the long thoracic artery, arteria thoracalis lateralis; the (long) subscapular artery, arteria subscapularis, and its division into the dorsal scapular artery, arteria circumflexa scapulae, and the thoracodorsalis artery, arteria thoracodorsalis (see Appendix, note 203); the anterior and posterior circumflex arteries (of the arm), arterie circumflexe humeri, anterior et posterior.

A. subclavia, the subclavian artery; A. axillaris, the axillary artery.

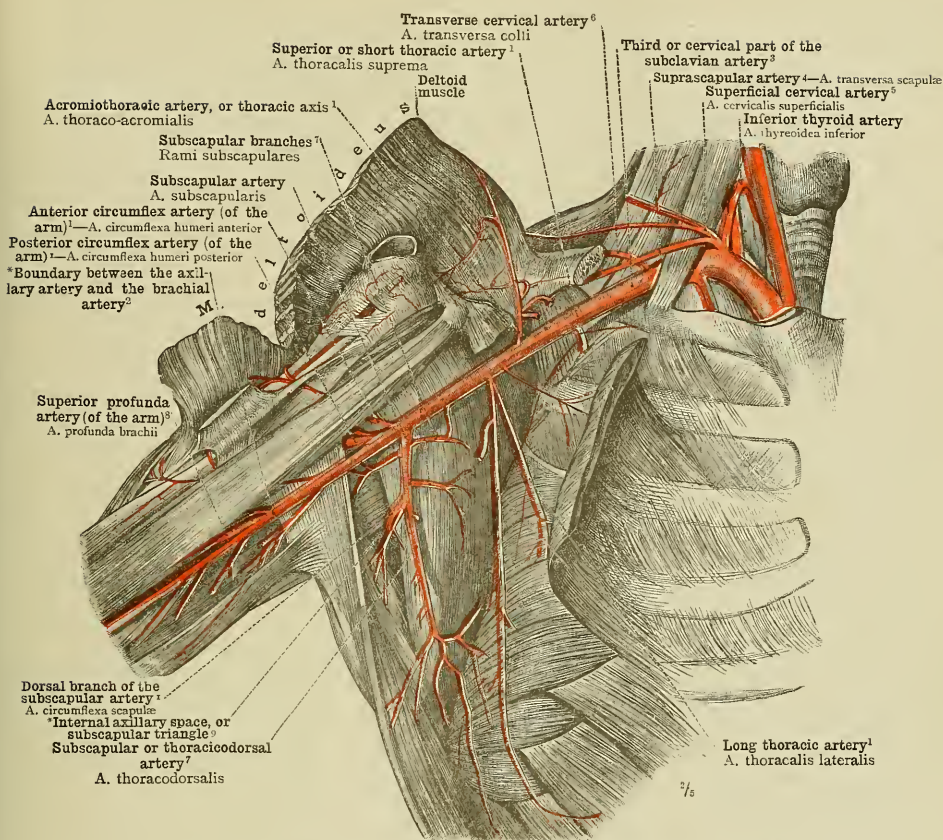
¹ See Appendix, note 206.² See Appendix, note 207.³ See Appendix, note 205.⁴ Known also as the *transverse scapular* or *transverse humeral* artery.⁵ See Appendix, note 208.⁶ See Appendix, notes 134, 135, 172, and 200.⁷ See Appendix, notes 202 and 209.⁸ See Appendix, note 209.⁹ See Part III. of this work, p. 312, Fig. 559, and note ¹ to same page.

FIG. 1018.—THE DISTRIBUTION OF THE BRANCHES OF THE AXILLARY ARTERY AS SEEN AFTER THE ANTERIOR WALL OF THE AXILLA AND THE BRACHIAL PLEXUS HAVE BEEN ENTIRELY REMOVED; SEEN FROM THE FRONT AND THE INNER SIDE. THE SUPERIOR OR SHORT THORACIC ARTERY, ARTERIA THORACICA SUPREMA; THE LONG THORACIC ARTERY, ARTERIA THORACALIS LATERALIS; THE ACROMIOTHORACIC ARTERY, OR THORACIC AXIS, ARTERIA THORACO-ACROMIALIS; THE SUBSCAPULAR ARTERY, ARTERIA SUBSCAPULARIS, GIVING OFFSETS TO THE SUBSCAPULARIS MUSCLE, RAMI SUBSCAPULARES, AND DIVIDING (see Appendix, notes 202 and 209) INTO THE ARTERIA THORACODORSALIS (CONTINUATION OF THE SUBSCAPULAR ARTERY, OR THORACICODORSAL ARTERY) AND THE ARTERIA CIRCUMFLEXA SCAPULÆ (DORSAL BRANCH OF THE SUBSCAPULAR ARTERY, OR DORSALIS SCAPULÆ ARTERY); THE ANTERIOR AND POSTERIOR CIRCUMFLEX ARTERIES (OF THE ARM), ARTERIÆ CIRCUMFLEXÆ HUMERI ANTERIOR ET POSTERIOR.

In the preparation shown in Fig. 1017, the sternal extremity of the clavicle and the pectoralis major muscle were removed; the pectoralis minor muscle was cut across, its inner segment being turned towards the median line, and the brachial plexus was removed. The arm was abducted, a transverse incision was made into the anterior border of the deltoid muscle, and this muscle was turned outwards, in order to display the course of the anterior circumflex artery (of the arm) and its anterior articular branch. Regarding the branches of the axillary artery, see Appendix, note 206; and regarding the parts of the axillary artery, see Appendix, note 207.

A. subclavia, the subclavian artery; A. axillaris, the axillary artery.

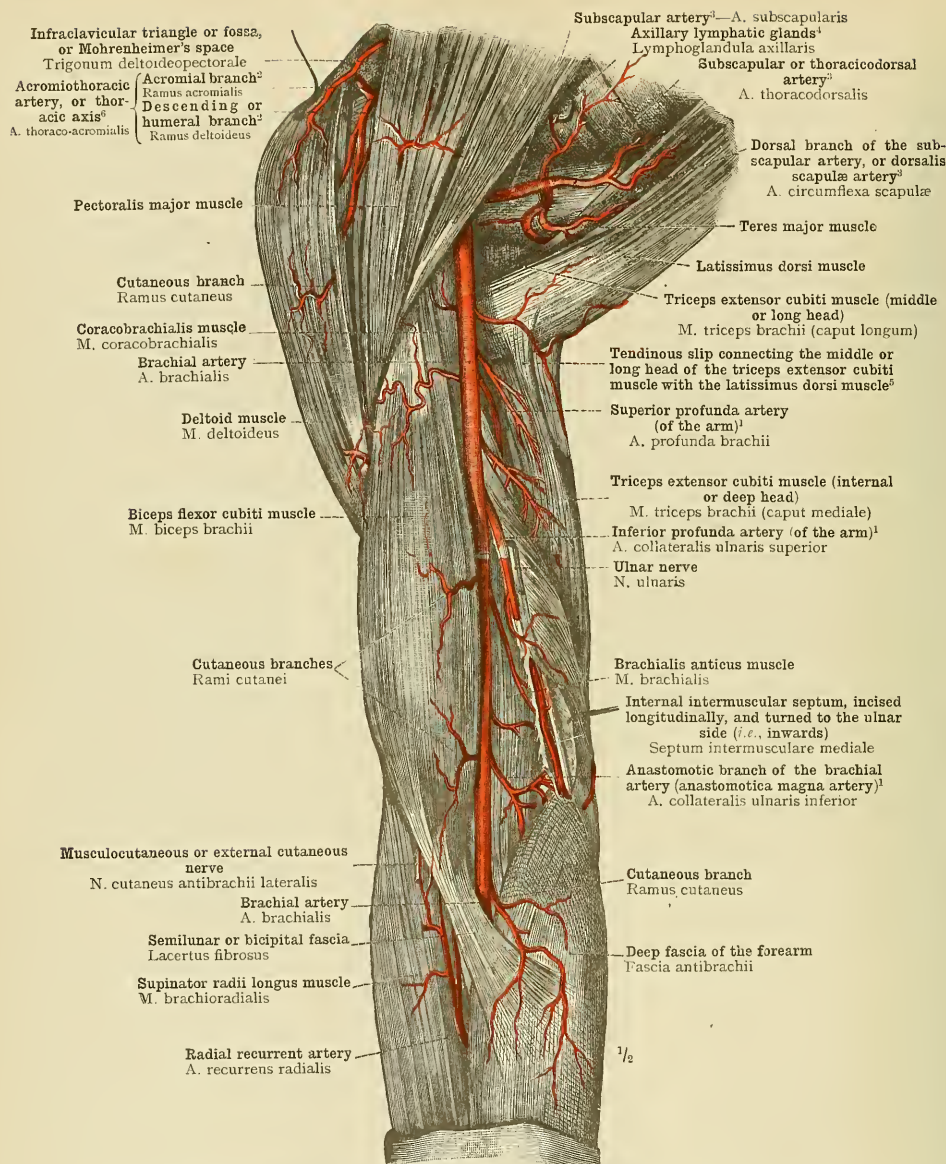
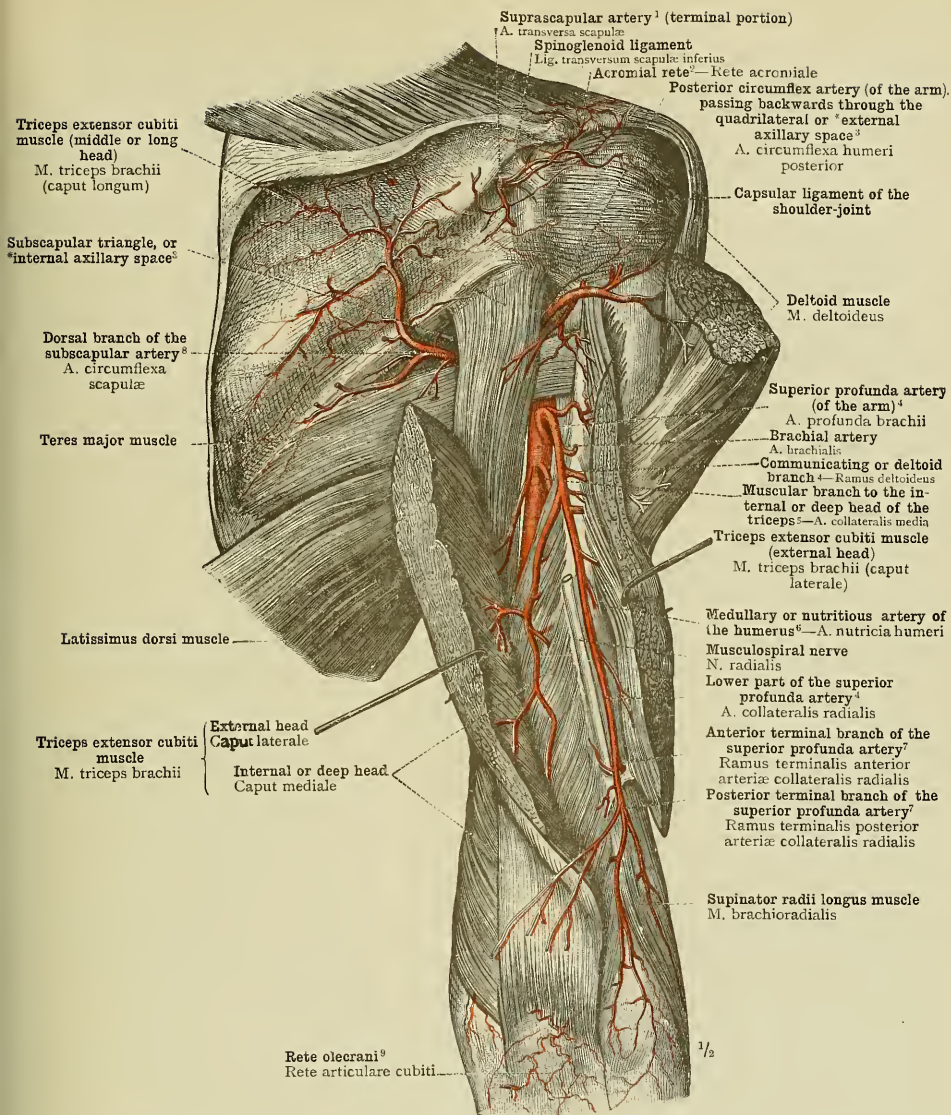
² See Appendix, note 209.³ See Appendix, note 206.³ See Appendix, notes 203 and 206.⁴ This, being one of the glands lying on the serratus magnus muscle at the lower border of the pectoral muscles, belongs to the *pectoral* group of axillary lymphatic glands (Quain).—Tr.⁵ This slip is vestigial in nature, representing the *dorso-epitrahclaris* or *accessorius tricipitis* muscle which is commonly met with in quadrupeds, and exists in many other mammals. (See Quain, *op. cit.*, vol. II, pp. 206 and 221, and Macalister, *op. cit.*, p. 295).—Tr.⁶ Called by Macalister the *thoraco-acromial* artery. See Appendix, note 206.

FIG. 1019.—THE ARTERIES OF THE RIGHT UPPER ARM, SHOULDER, AND AXILLARY REGION; SEEN FROM THE FRONT AND THE INNER SIDE.

Regarding the branches of the brachial artery, see Appendix, note 209; and regarding the upper limit of the brachial artery, see Appendix, note 210.



¹ Known also as the *transverse scapular* or *transverse humeral artery*.

² See Appendix, note 179.

³ See note ¹ to p. 312 in Part III.

⁴ See Appendix, note 209.

⁵ Arising in this instance direct from the brachial artery, instead of, as normally, from the superior profunda artery. See Appendix, note 209.

⁶ This is the *medullary or nutritive branch* of the superior profunda artery, not the *chief medullary artery* of the humerus, which enters a foramen somewhat lower down in the shaft of the humerus. See Appendix, note 209.

⁷ See Appendix, note 211.

⁸ See Appendix, notes 203 and 208.

⁹ See Appendix, note 212.

FIG. 1020.—THE DEEP ARTERIES AT THE BACK OF THE RIGHT UPPER ARM AND THE RIGHT SHOULDER; THE ARTERIAL NETWORK OF THE ELBOW, RETE OLECRANI OR RETE ARTICULARE CUBITI (see Appendix, note 212).

The posterior part of the deltoid muscle was removed, in addition to the infraspinatus and teres minor muscles, and the external head of the triceps extensor cubiti muscle was divided by a longitudinal incision, the parts being widely separated.

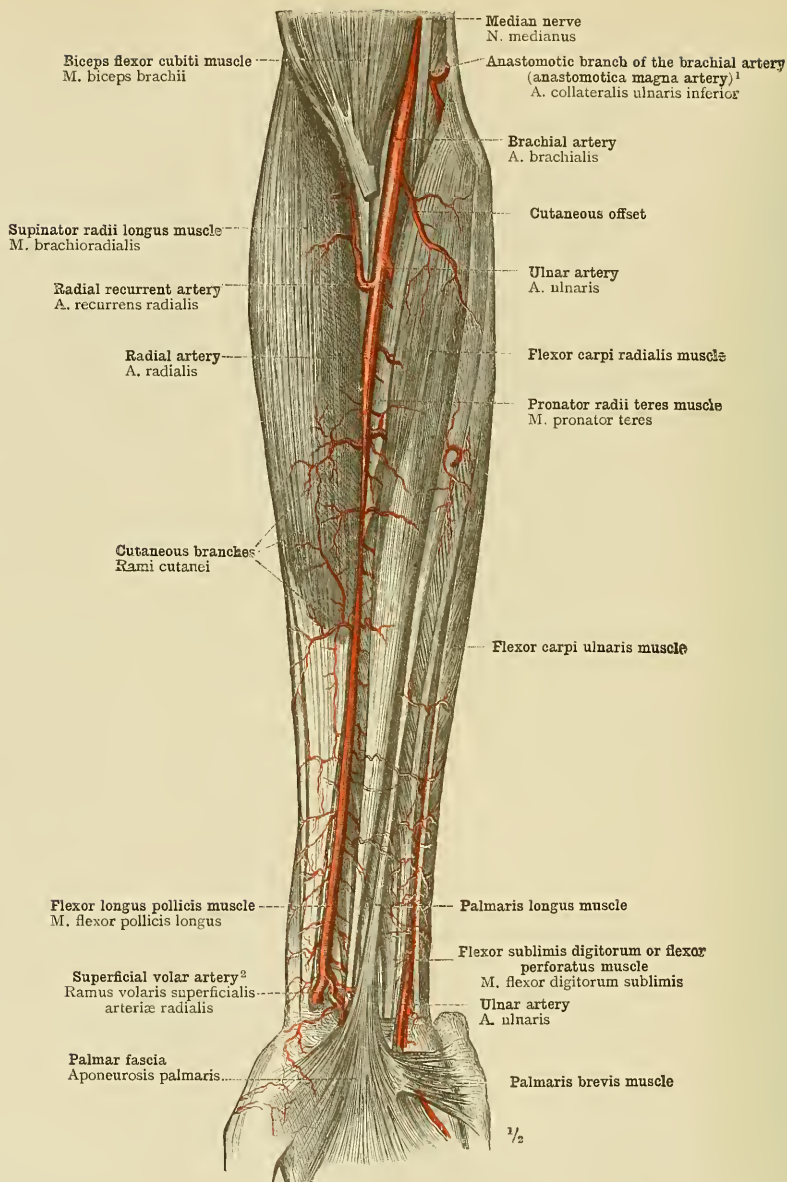
¹ See Appendix, note ³⁶².² Often known in England by the Latin name of *superficialis volæ artery*.—Tr.

FIG. 1021.—THE SUPERFICIAL ARTERIES OF THE ANTECUBITAL FOSSA AND THE PALMAR SURFACE OF THE RIGHT FOREARM.

Palmar Arteries of the Forearm and the Hand.

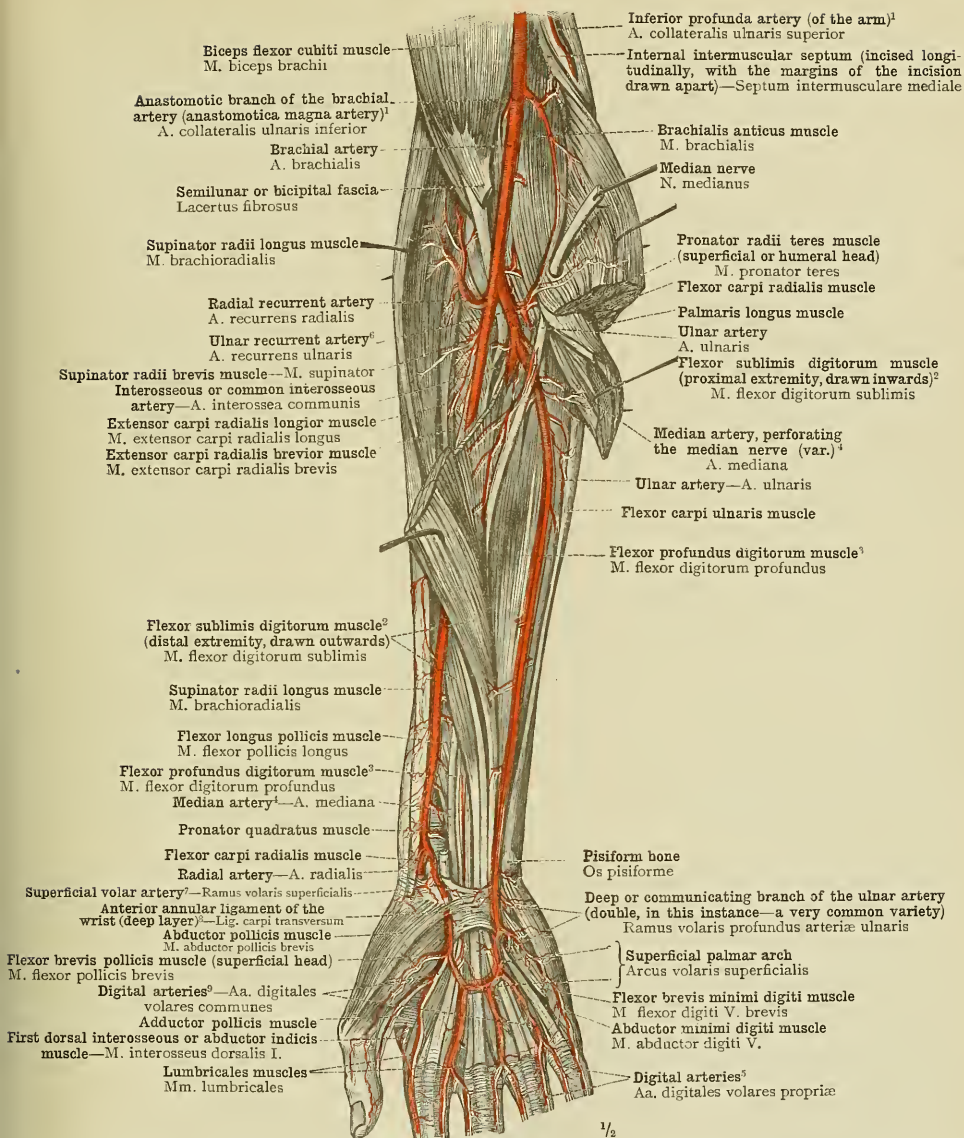
¹ See Appendix, note 209.² Or *flexor perforans* muscle.³ Or *flexor perforans* muscle.⁴ *Median Artery*.—Called by Macalister *conus nervi mediani artery*.⁵ Or *collateral digital arteries*, see Appendix, note 213.⁶ The *anterior ulnar recurrent artery* and the *posterior ulnar recurrent artery* are here seen arising by a common stem. This variety is of frequent occurrence.—*Tr.*⁷ See note 2 to p. 629.⁸ See Appendix, note 214.⁹ See Appendix, note 215.

FIG. 1022.—THE RADIAL AND ULNAR ARTERIES AND THE SUPERFICIAL PALMAR ARCH.

The unusually large median artery (comes nervi mediani artery) perforates in this specimen the median nerve.

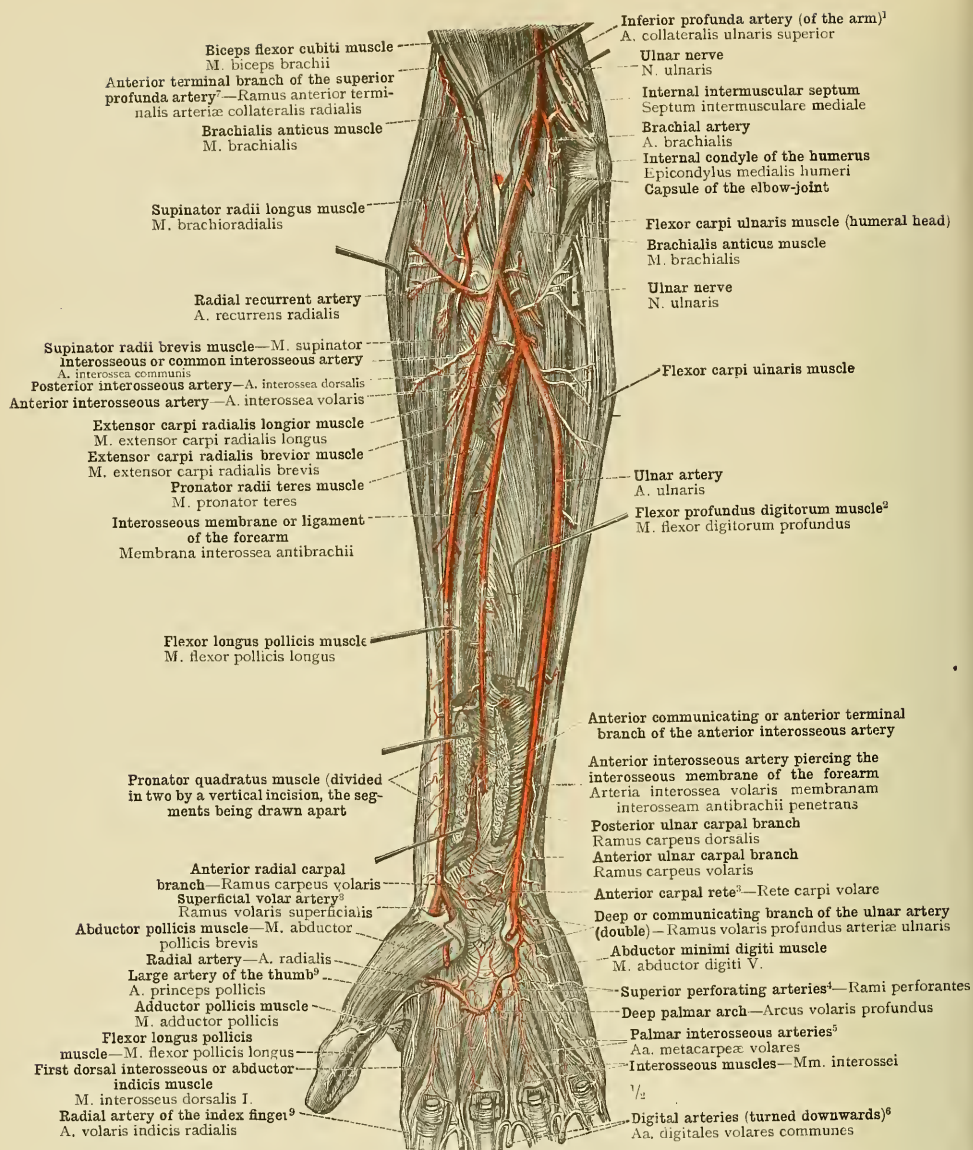
¹ See Appendix, note 209.² Or *flexor perforans* muscle.³ See Appendix, note 215.⁴ See Appendix, note 216.⁵ Called by Macalister the descending digital branches of the deep palmar arch.⁶ See Appendix, note 213.⁷ See Appendix, note 217.⁸ See note 2 to p. 632.⁹ See Appendix, note 218.

FIG. 1023.—THE ANTERIOR INTEROSSEOUS ARTERY OF THE RIGHT FOREARM AND THE DEEP PALMAR ARCH; SEEN FROM BEFORE.

Palmar Arteries of the Forearm and Hand.

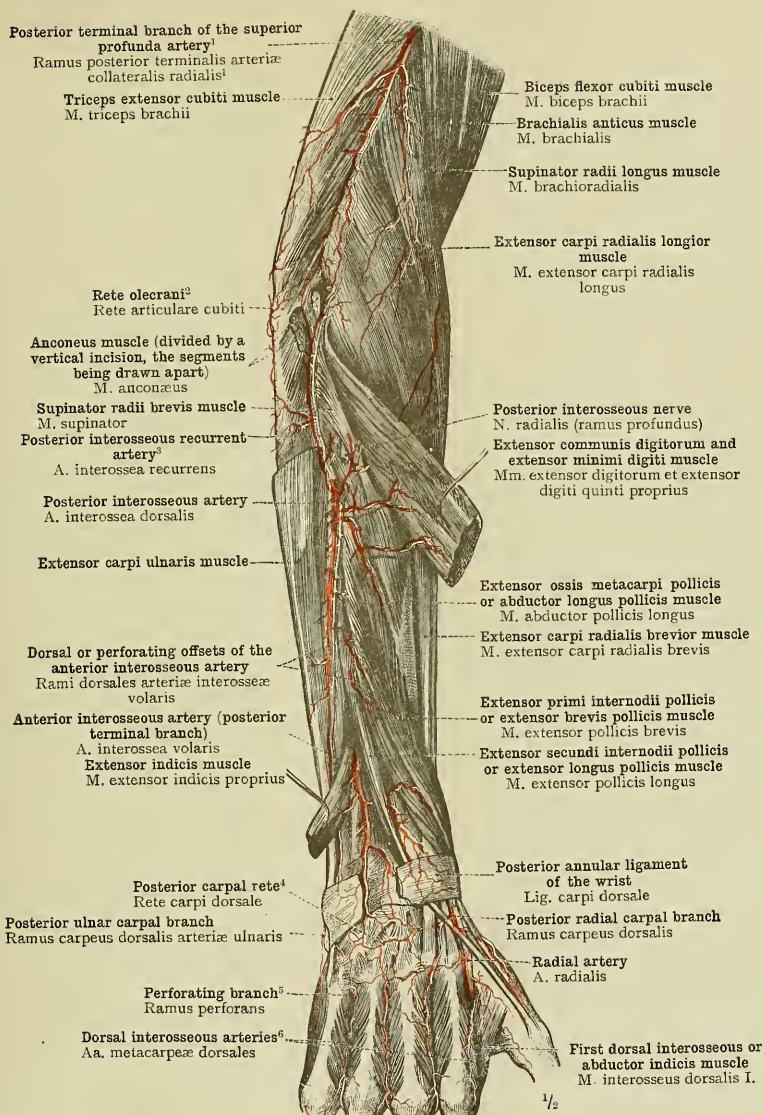
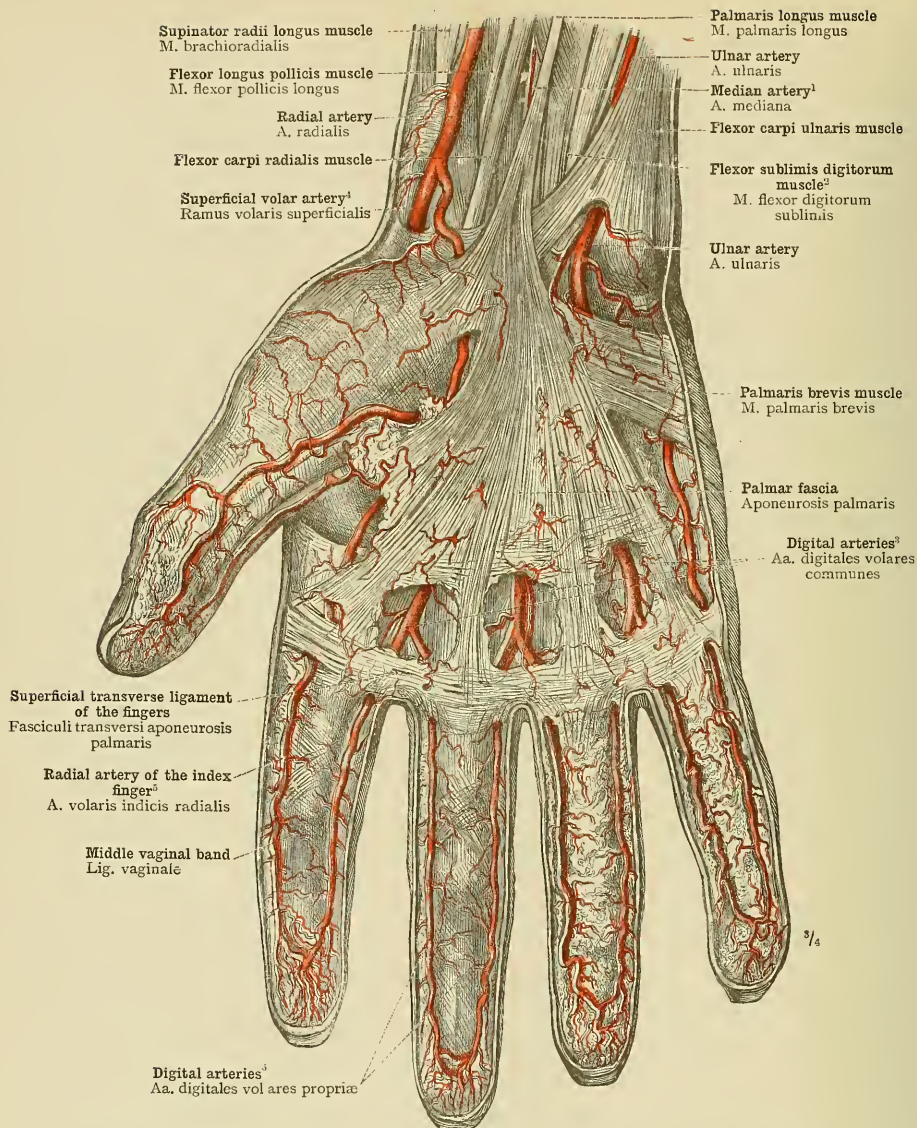
¹ See Appendix, note 217.³ Often called the *interosseous recurrent* artery without further qualification, as the anterior interosseous artery gives no recurrent branch.—Tr.⁴ See Appendix, note 22.² See Appendix, note 212.⁵ See Appendix, note 216.⁶ See Appendix, note 220.

FIG. 1024.—ARTERIÆ INTEROSSEA DORSALIS ET INTEROSSEA RECURRENS, THE POSTERIOR INTEROSSEOUS AND POSTERIOR INTEROSSEOUS RECURRENT ARTERIES; THE POSTERIOR OR POSTERIOR BRANCH OF THE ANTERIOR INTEROSSEOUS ARTERY, ARTERIA INTEROSSEA VOLARIS; THE DEEP ARTERIES OF THE DORSUM OF THE HAND



¹ Called by Macalister *comes nervi mediani artery*.

⁴ See note ² to p. 632.

⁵ See Appendix, note 218.

² Or *flexor perforatus muscle*.

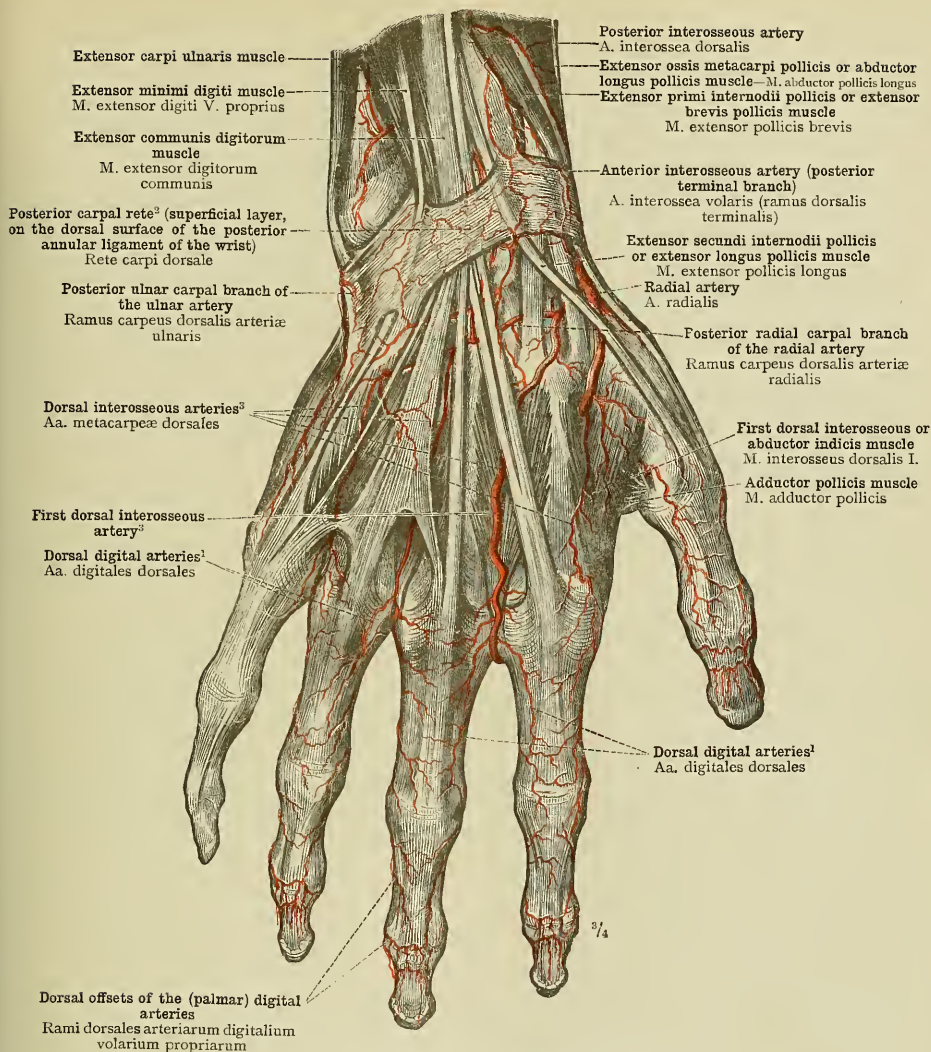
⁶ Or *collateral digital arteries*.

³ See Appendix, note 213.

See Appendix, note 213.

FIG. 1025.—THE SUPERFICIAL ARTERIES OF THE PALM OF THE HAND; THE PALMAR DIGITAL ARTERIES.

In the thumb, the index, and the middle finger, the skin and the superficial fascia have been removed, thus exposing the digital sheaths of the flexor tendons (ligamenta vaginalia, etc.). In the ring and little fingers, the superficial fascia and the arteries ramifying in it have been preserved.



¹ These minute vessels are often ignored by English anatomists. See Appendix, note 213.—Tr.

² See Appendix, note 210.

³ The first dorsal interosseous artery is called by Macalister the metacarpal branch of the radial artery. For the origin of this and the other dorsal interosseous arteries, see Appendix, note 220.—Tr.

FIG. 1026.—THE SUPERFICIAL ARTERIES OF THE DORSUM OF THE HAND: THE RADIAL ARTERY, ARTERIA RADIALIS; THE POSTERIOR RADIAL CARPAL ARTERY, RAMUS CARPEUS DORSALIS ARTERIÆ RADIALIS, AND THE POSTERIOR ULNAR CARPAL ARTERY, RAMUS CARPEUS DORSALIS ARTERIÆ ULNARIS; THE POSTERIOR TERMINAL BRANCH OF THE ANTERIOR INTEROSSEOUS ARTERY, RAMUS DORSALIS TERMINALIS ARTERIÆ INTEROSSEÆ VOLARIS; THE SUPERFICIAL LAYER OF THE POSTERIOR CARPAL RETE, LAMINA SUPERFICIALIS RETIS CARPI DORSALIS; THE DORSAL INTEROSSEOUS ARTERIES, ARTERIÆ INTEROSSEÆ DORSALES; THAT OCCUPYING THE BACK OF THE SECOND SPACE (FIRST DORSAL INTEROSSEOUS ARTERY, ACCORDING TO QUAIN; METACARPAL BRANCH OF THE RADIAL ARTERY, ACCORDING TO MACALISTER) IS USUALLY LARGE (A COMMON VARIETY). THE DORSAL DIGITAL ARTERIES, ARTERIÆ DIGITALES DORSALES, AND THE DORSAL OFFSETS OF THE PALMAR DIGITAL ARTERIES, RAMI DORSALES ARTERIARUM DIGITALIUM VOLARIUM PROPRIARUM. THE RIGHT HAND WITH THE DISTAL EXTREMITY OF THE FOREARM; SEEN FROM BEHIND.

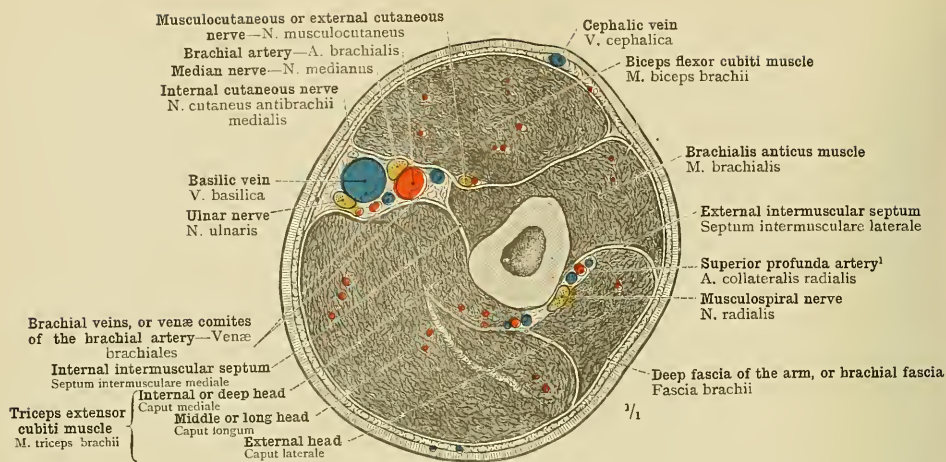


FIG. 1027.—TRANSVERSE SECTION THROUGH THE MIDDLE OF THE RIGHT UPPER ARM; UPPER SURFACE OF LOWER SEGMENT.

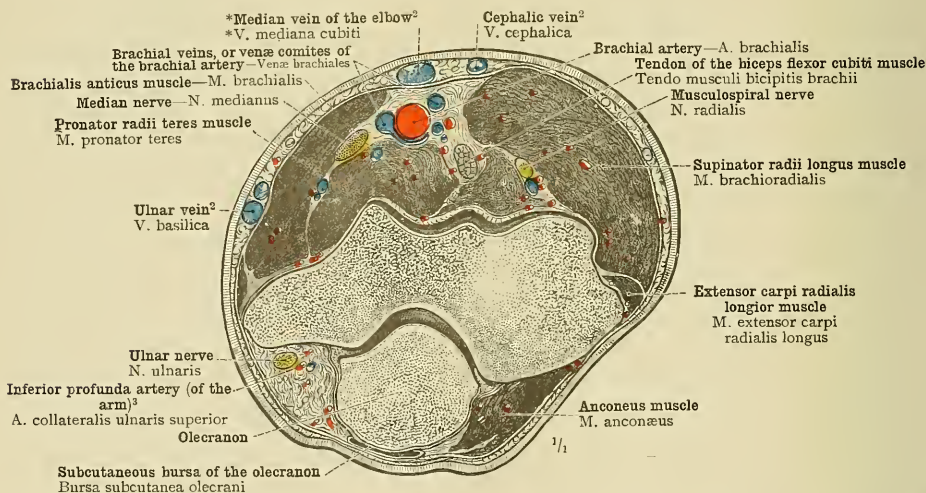


FIG. 1028.—TRANSVERSE SECTION THROUGH THE EXTENDED ELBOW-JOINT AT THE LEVEL OF THE TWO CONDYLES; UPPER SURFACE OF LOWER SEGMENT.

¹ See Appendix, notes 209 and 217.

² See Appendix, note 221.

³ See Appendix, note 209.

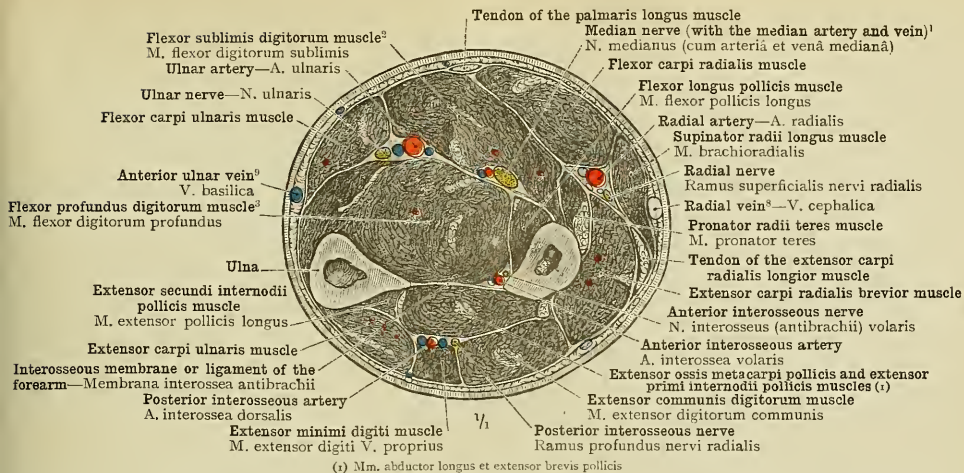


FIG. 1029.—TRANSVERSE SECTION THROUGH THE RIGHT FOREARM, A LITTLE ABOVE THE MIDDLE OF ITS VERTICAL EXTENT (AT THE LEVEL OF THE INSERTION OF THE PRONATOR RADII TERES MUSCLE); UPPER SURFACE OF LOWER SEGMENT.

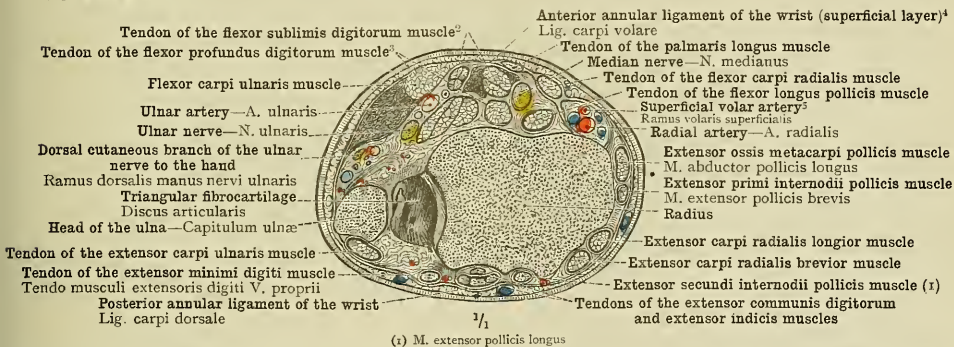


FIG. 1030.—TRANSVERSE SECTION THROUGH THE DISTAL EXTREMITY OF THE RIGHT FOREARM, UPPER SURFACE OF LOWER SEGMENT.

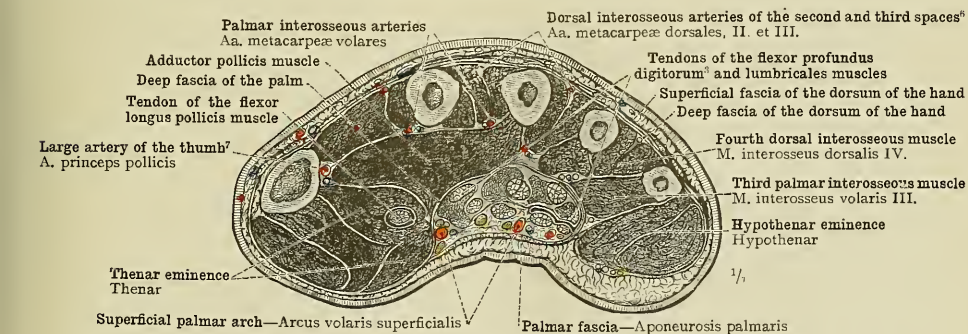


FIG. 1031.—TRANSVERSE SECTION THROUGH THE RIGHT HAND, IMMEDIATELY BELOW THE BASES OF THE METACARPAL BONES; UPPER SURFACE OF LOWER SEGMENT.

¹ Median Artery.—Called by Macalister *comes nervi mediani* artery.

² Or *flexor perforatus* muscle.

³ See Appendix, note 218.

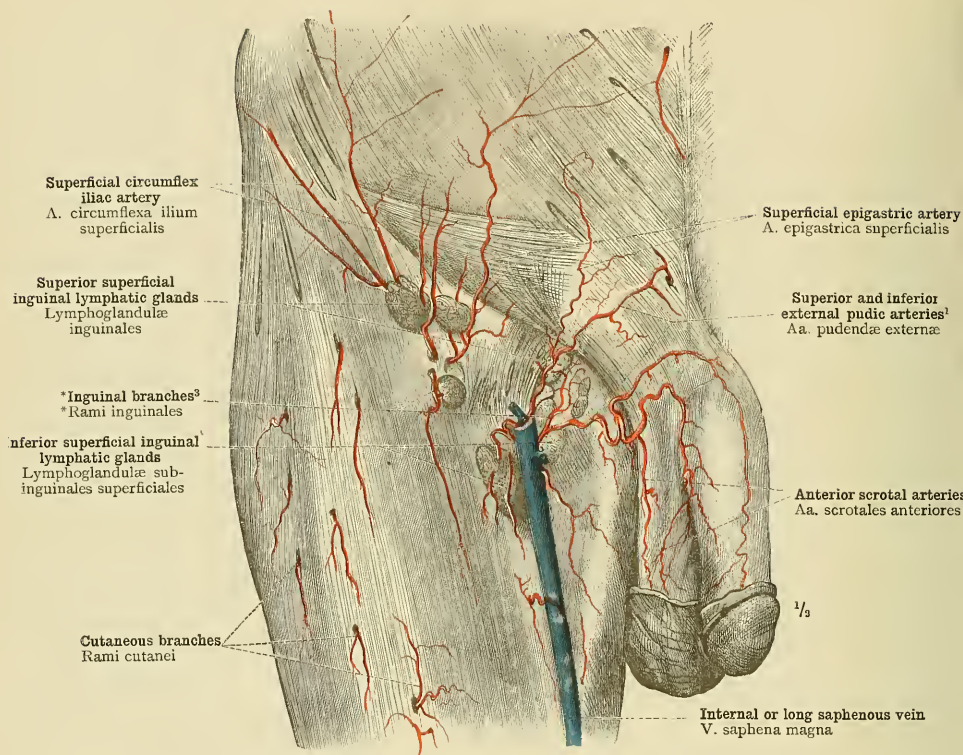
⁴ See Appendix, note 214.

⁵ See note ¹ to p. 697.

⁶ Or *flexor perforatus* muscle.

⁷ See note ¹ to p. 697.

⁸ See Appendix, note 227.



¹ The upper of these is named by Macalister the *superior* or *superficial pudic*, the lower, the *inferior pudic artery*.—Tr.

² See Appendix, note 13⁸.

³ *Rami inguinales*.—According to Von Langer and Toldt (*op. cit.*, p. 323) there are **inguinal branches* of the femoral artery, to the skin and superficial lymphatic glands of this region, in addition to the four superficial branches of the femoral artery commonly enumerated, viz., *superficial epigastric*, *superficial circumflex iliac*, and *superior* and *inferior external pudic* arteries (see note ¹ above). Quain does not mention independent inguinal branches, stating that the four superficial branches just enumerated all give small branches to the lymphatic glands in the groin. Macalister mentions an additional superficial branch of the femoral artery in Scarpa's triangle, the *saphenous*, "one, two, or three branches descending to the skin and lymphatic glands external to the saphena vein" (*op. cit.*, p. 436). These *saphenous* branches are in part identical with the *rami inguinales* of Toldt.—Tr.

⁴ Often called *femoral lymphatic glands*.

⁵ *Subinguinal Fossa*.—"Immediately below Poupart's ligament, a slight hollow is generally seen, corresponding to Scarpa's triangular space, in which, just internal to the centre, the femoral artery may be felt pulsating." (Quain, *op. cit.*, 'Appendix on Superficial and Surgical Anatomy,' p. 43). Though this author describes the hollow in question, he gives it no distinctive name, and I have therefore used a translation of Toldt's name of *fossa subinguinalis*.—Tr.

FIG. 1032.—THE SUBCUTANEOUS ARTERIES OF THE HYPOGASTRIC REGION (REGIO HYPOGASTRICA), THE INGUINAL REGION, THE MALE EXTERNAL GENERATIVE ORGANS, THE SUBINGUINAL FOSSA (see note ⁵ above) AND THE ADJOINING REGIONS OF THE RIGHT THIGH; THE SUPERIOR AND INFERIOR SUPERFICIAL INGUINAL LYMPHATIC GLANDS AND THE PROXIMAL PORTION OF THE INTERNAL OR LONG SAPHEOUS VEIN; SEEN FROM BEFORE.

The cribriform fascia (fascia cribrosa), the intercolumnar or spermatic fascia (fascia cremasterica Cooperi), and the deep fascia of the penis, have been left intact.

Arteries of the Front of the Thigh.

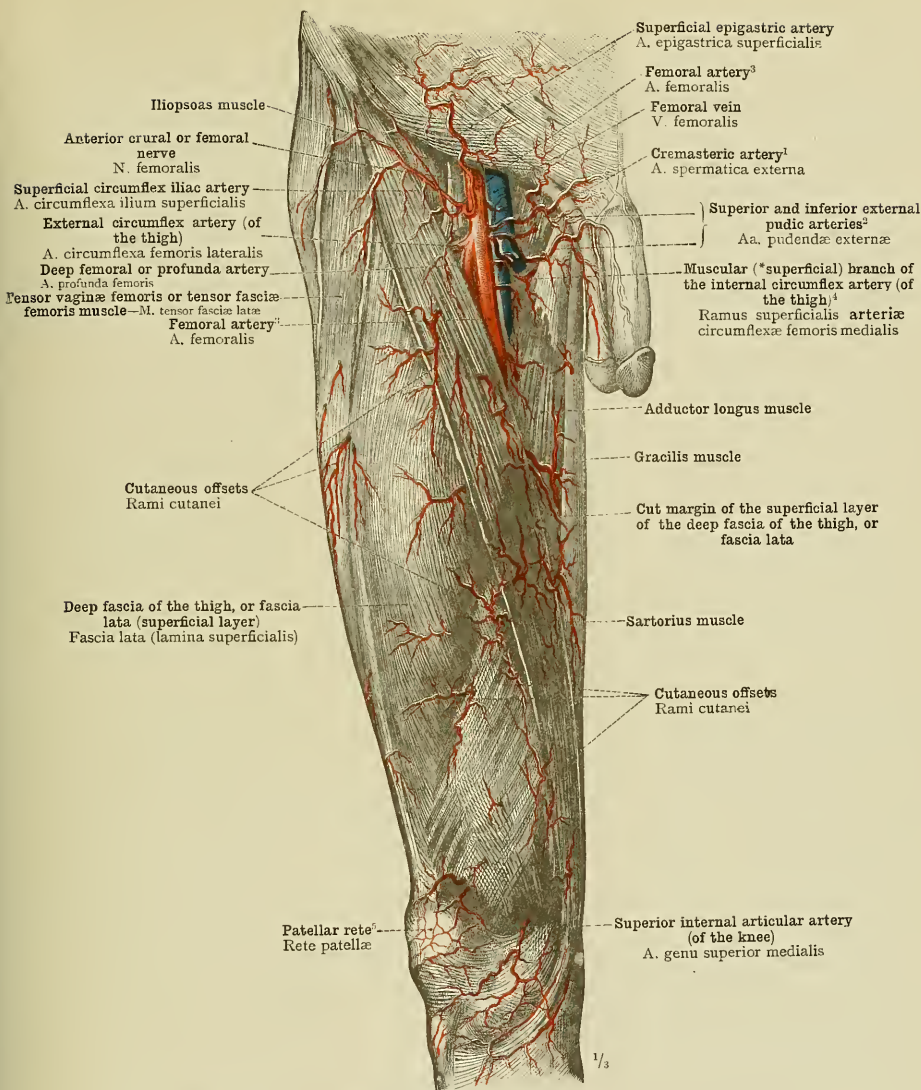
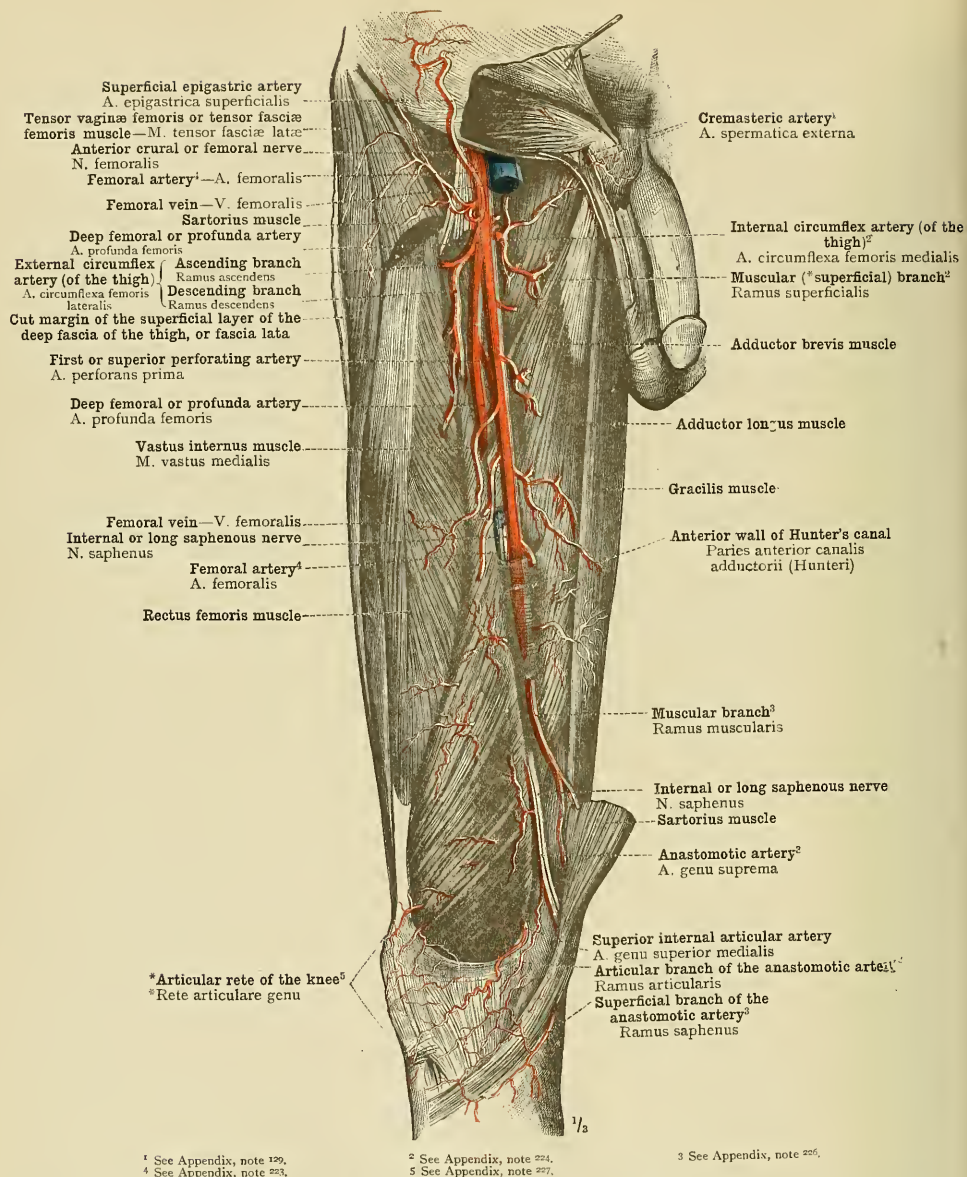
¹ See Appendix, note 129.² The upper of these is called by Macalister the *superior* or *superficial pubic*, the lower, the *inferior pubic* artery.—Tr.³ See Appendix, note 223.⁴ See Appendix, note 224.⁵ See Appendix, note 225.

FIG. 1033.—THE TOPOGRAPHICAL ANATOMY OF SCARPA'S TRIANGLE (TRIGONUM FEMORALE VEL FOSSA SCARPÆ MAJOR) AND THE SUBCUTANEOUS ARTERIES OF THE ANTERIOR SURFACE OF THE RIGHT THIGH, THE REGION OF THE KNEE-JOINT, THE EXTERNAL GENERATIVE ORGANS, AND THE HYPOGASTRIC REGION (REGIO HYPOGASTRICA); SEEN FROM BEFORE.

The superficial layer of the deep fascia of the thigh, or fascia lata, has been removed in the region of Scarpa's triangle, and also from the surfaces of the sartorius, adductor longus, and tensor vaginae femoris muscles.



¹ See Appendix, note 129.
⁴ See Appendix, note 223.

² See Appendix, note 224.
⁵ See Appendix, note 227.

³ See Appendix, note 226.

FIG. 1034.—THE FEMORAL ARTERY, ARTERIA FEMORALIS (see Appendix, note 223), EXPOSED AS FAR AS ITS ENTRY INTO HUNTER'S CANAL (see Appendix, note 225), AND THE DEEP FEMORAL OR PROFUNDA ARTERY, ARTERIA PROFUNDA FEMORIS.

The middle portion of the sartorius muscle has been cut away.

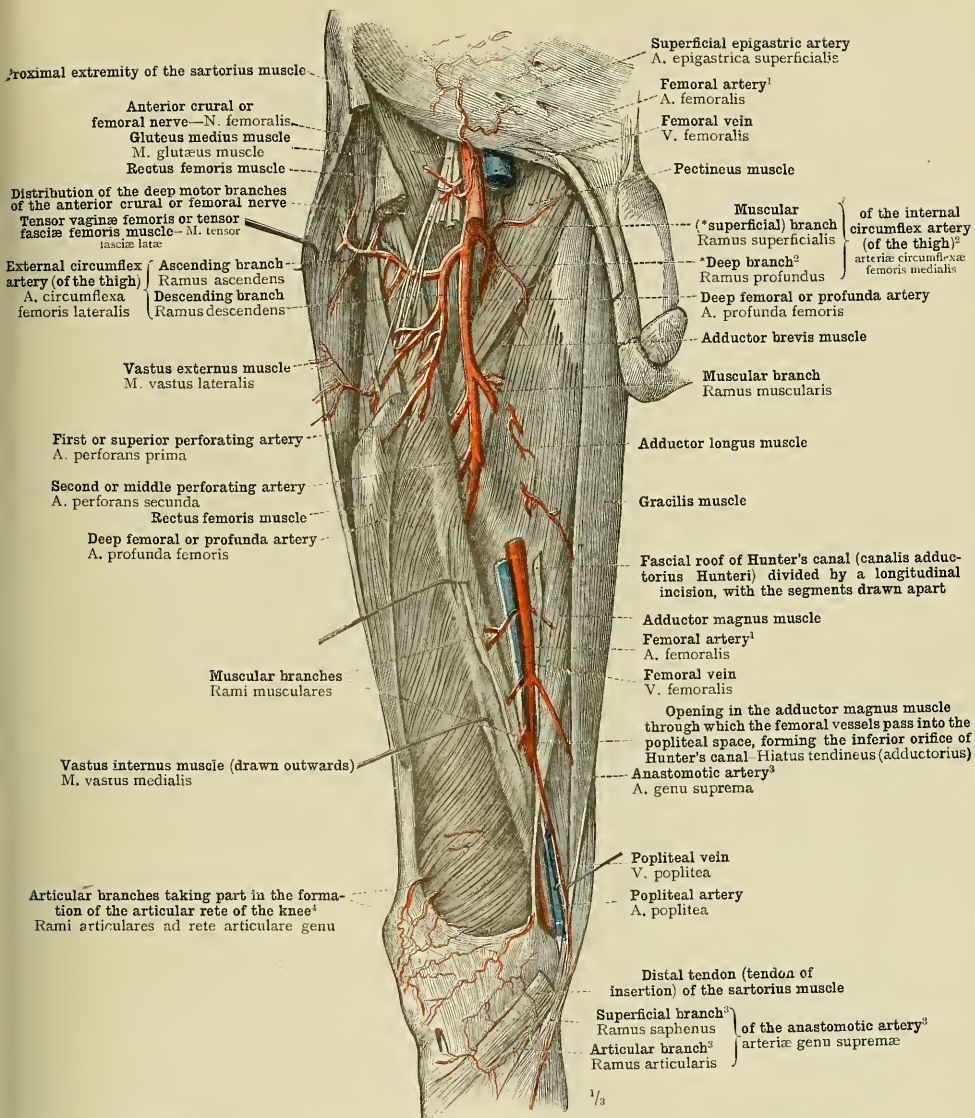
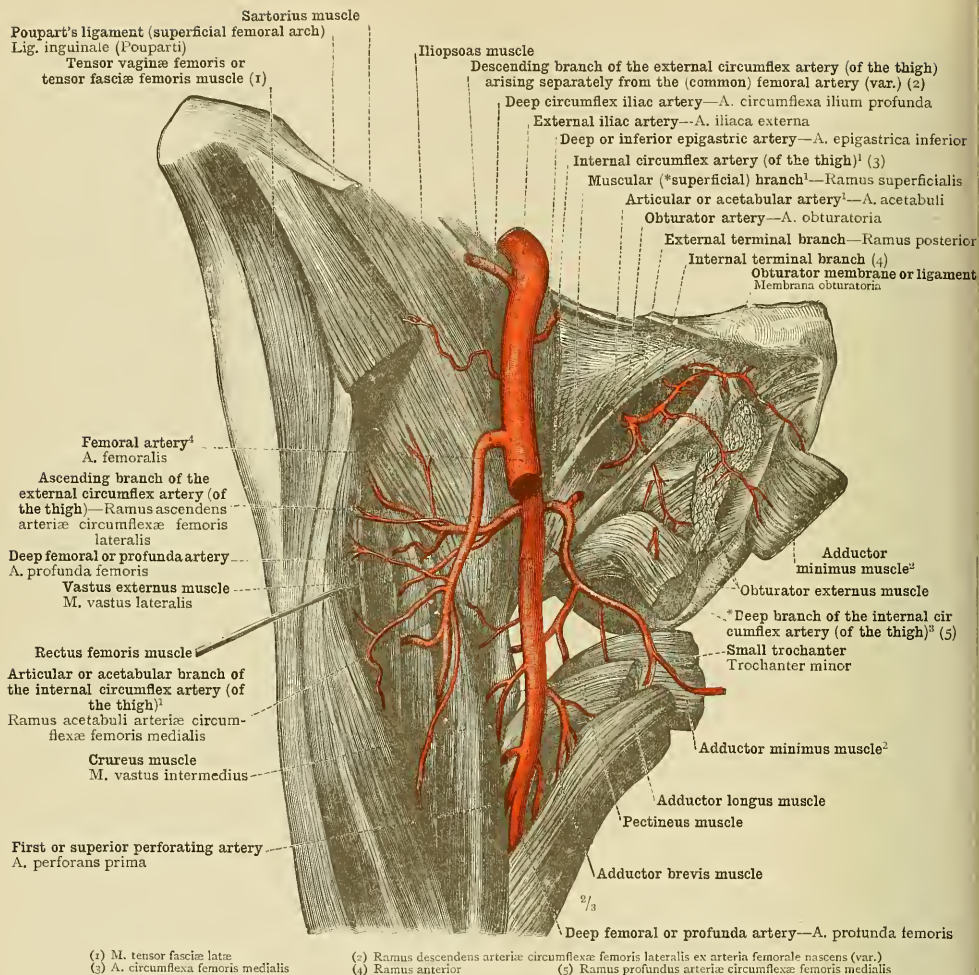
¹ See Appendix, note 223.² *Ramus Profundus*.—The so-called "deep branch" of the internal circumflex artery is by English anatomists regarded as the continuation of that vessel itself. See Appendix, note 224.—Tr.³ See Appendix, note 226.⁴ See Appendix, note 227.

FIG. 1035.—THE DEEP FEMORAL OR PROFUNDA ARTERY, ARTERIA PROFUNDA FEMORIS, EXPOSED BY THE PARTIAL REMOVAL OF THE (SUPERFICIAL) FEMORAL ARTERY (see Appendix, note 223); THE (SUPERFICIAL) FEMORAL ARTERY AND VEIN, ARTERIA ET VENA FEMORALIS, IN HUNTER'S CANAL (CANALIS ADDUCTORIUS HUNTERI), THE FASCIAL ROOF OF WHICH HAS BEEN DIVIDED; THE PASSAGE OF THE (SUPERFICIAL) FEMORAL VESSELS THROUGH THE OPENING IN THE ADDUCTOR MAGNUS MUSCLE (HIATUS TENDINEUS ADDUCTORIUS). SEEN FROM BEFORE.



¹ See Appendix, note 224.

² *Adductor Minimus Muscle*.—This, by English anatomists, is usually regarded, not as a separate muscle, but as the anterior and superior portion of the adductor magnus muscle. See note 2 to p. 345 in Part III. of this work.—Tr.

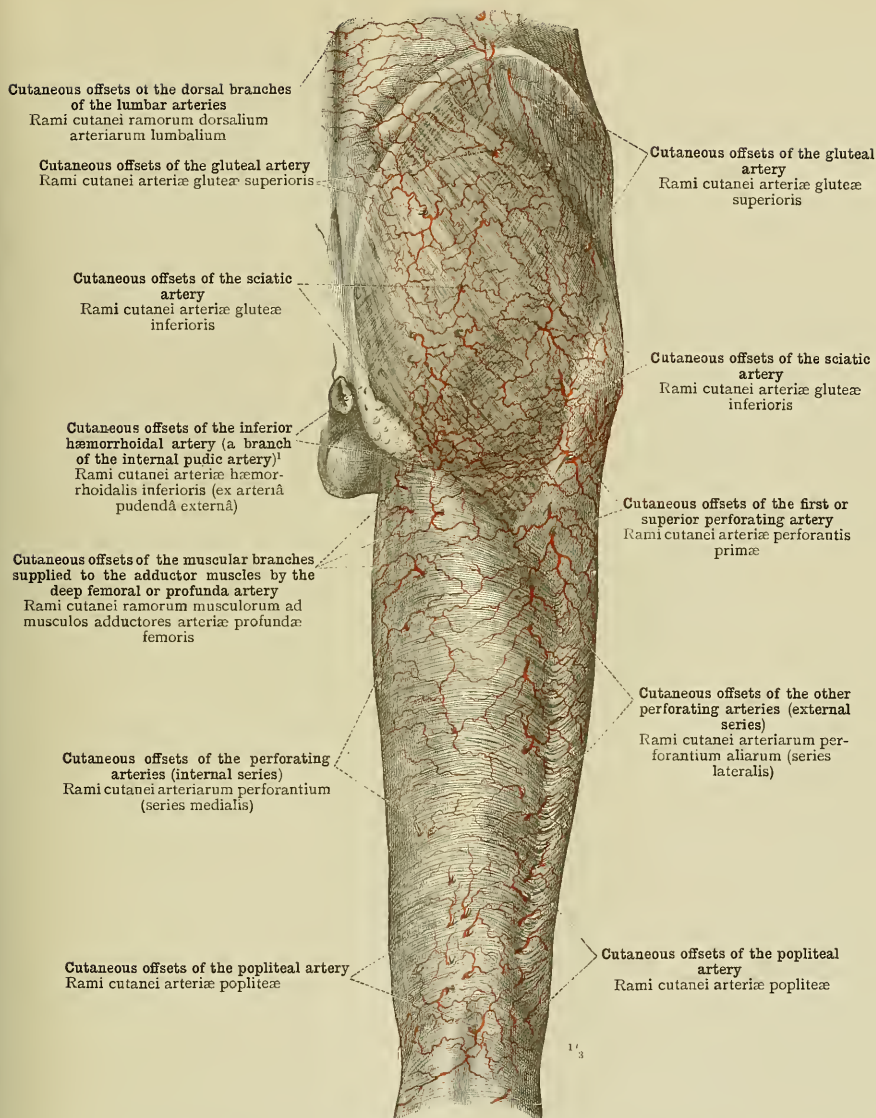
³ See note 2 to p. 643 and Appendix, note 224.

⁴ See Appendix, note 223.

FIG. 1036.—THE RIGHT OBTURATOR ARTERY, ITS DIVISION INTO INTERNAL AND EXTERNAL TERMINAL BRANCHES, AND THE ORIGIN FROM THE LATTER OF THE ARTICULAR OR ACETABULAR ARTERY. THE DEEP FEMORAL OR PROFUNDA ARTERY, THE *DEEP BRANCH OF THE INTERNAL CIRCUMFLEX ARTERY (see Appendix, note 224), AND ITS ARTICULAR OR ACETABULAR BRANCH, RAMUS ACETABULI. OF THE TWO PRINCIPAL BRANCHES OF THE EXTERNAL CIRCUMFLEX ARTERY, THE ASCENDING BRANCH ARISES IN THIS SPECIMEN FROM THE DEEP FEMORAL OR PROFUNDA ARTERY, BUT THE DESCENDING BRANCH ARISES FROM THE (COMMON) FEMORAL ARTERY (VAR.).

The sartorius muscle has been removed, except for the proximal extremity; the pectineus, adductor longus, and adductor brevis muscles have been divided transversely, the parts below the incision have been drawn inwards, and the proximal extremities have been cut away. The adductor magnus muscle has been entirely removed, the adductor minimus muscle (see note 2 above) has been divided transversely, and the segments have been drawn apart. The obturator externus muscle, which has been thus exposed, has been divided by an incision passing vertically downwards from its upper border, and the inner segment of the muscle has been turned downwards and inwards.

Arteries of the Front of the Thigh.



¹ *Inferior Hæmorrhoidal Artery*.—Quain gives *external hæmorrhoidal* as an alternative name for this vessel, while Macalister calls it the *anal* artery.

FIG. 1037.—THE CUTANEOUS ARTERIES OF THE BUTTOCK, THE BACK OF THE THIGH, AND THE HAM. RIGHT LOWER EXTREMITY, SEEN FROM BEHIND.

Arteries of the Buttock, the Back of the Thigh, and the Ham.

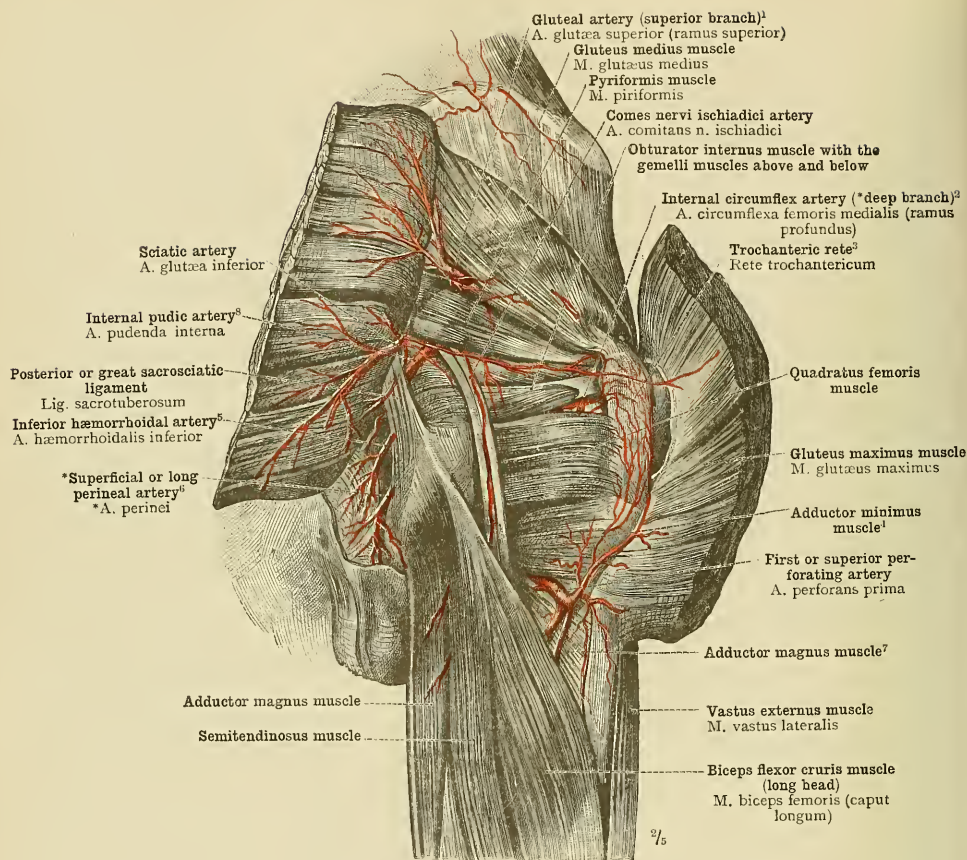
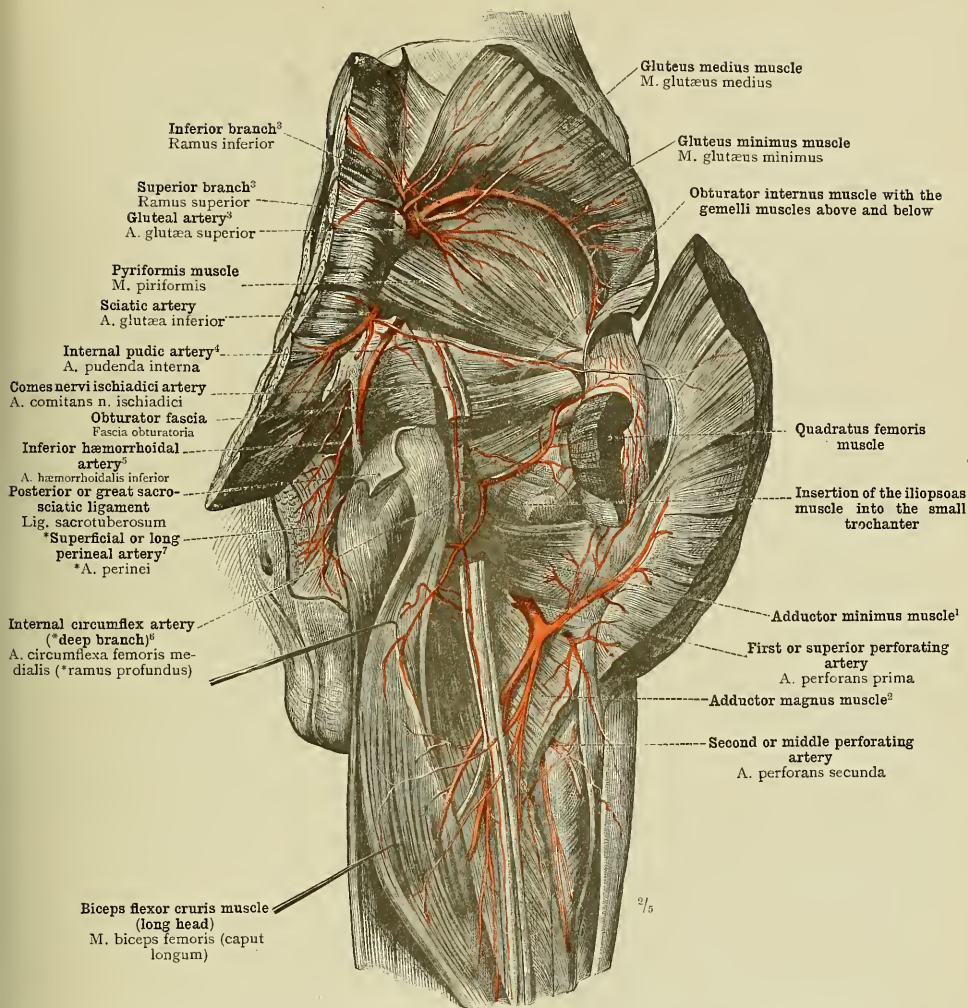
¹ See Appendix, note 227.² See note 2 to p. 613 and Appendix, note 224.³ See Appendix, note 230.⁴ See note 2 to p. 644.⁵ Quain gives *external hemorrhoidal* as an alternative name for this vessel, while Macalister calls it the *anal artery*.⁶ See Appendix, note 147.⁷ See Appendix, note 231.⁸ See Appendix, note 130.

FIG. 1038.—THE DEEP ARTERIES OF THE RIGHT BUTTOCK; SEEN FROM BEHIND. THE UPPER BRANCH, RAMUS SUPERIOR, OF THE DEEP PART OF THE GLUTEAL ARTERY, ARTERIA GLUTEA SUPERIOR; THE SCIATIC ARTERY, ARTERIA GLUTEA INFERIOR, AND THE COMES NERI ISCHIADICI ARTERY, ARTERIA COMITANS NERI ISCHIADICI; THE INTERNAL PUDIC ARTERY, ARTERIA PUDENDA INTERNA, FROM ITS EMERGENCE FROM THE PELVIS THROUGH THE GREAT SACROSPINIOUS FORAMEN TO ITS ENTRY INTO THE ISCHIORECTAL FOSSA THROUGH THE SMALL SACROSPINIOUS FORAMEN; THE INFERIOR OR EXTERNAL HEMORRHOIDAL ARTERY (ANAL ARTERY), ARTERIA HEMORRHOIDALIS INFERIOR, AND THE SUPERFICIAL OR LONG PERINEAL ARTERY, ARTERIA PERINEAL. THE EMERGENCE OF THE FIRST OR SUPERIOR PERFORATING ARTERY, ARTERIA PERFORANS PRIMA, BETWEEN THE ADDUCTOR MINIMUS AND ADDUCTOR MAGNUS MUSCLES (see note 2 to p. 614), AND ITS DIVISION INTO ASCENDING AND DESCENDING BRANCHES; THE CRUCIAL ANASTOMOSIS AND THE TROCHANTERIC RETE, RETE TROCHANTERICUM.

The gluteus maximus muscle has been cut across a little above and internal to its middle, and the segments have been turned inwards and outwards, respectively.

Arteries of the Buttock.



¹ See note ² to p. 644.

² See Appendix, note ²³¹.

³ See Appendix, note ²²⁰.

⁴ See Appendix, note ¹³⁹.

⁵ Quain gives *external hæmorrhoidal* as an alternative name for this vessel, while McCalister calls it the *anal artery*.

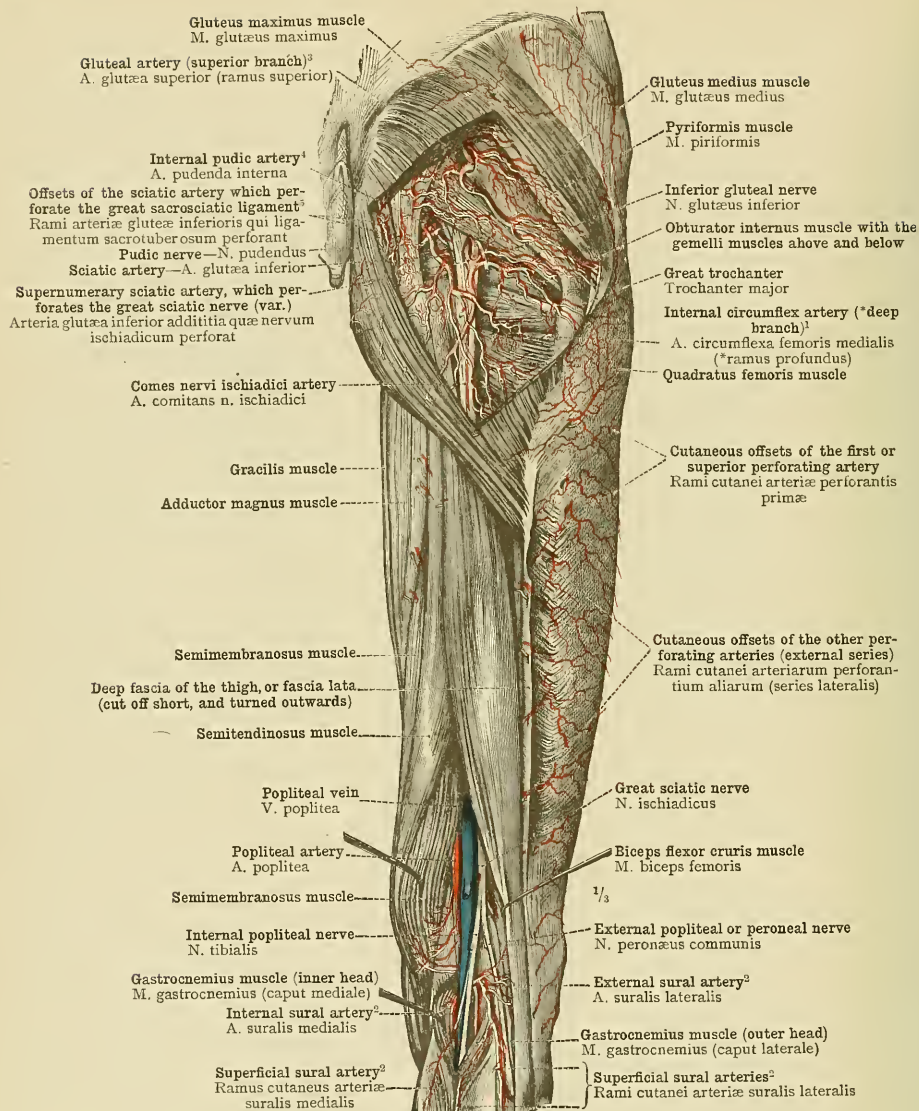
⁶ See note ² to p. 643 and Appendix, note ²²⁴.

⁷ See Appendix, note ¹⁴⁷.

FIG. 1039.—THE DEEP ARTERIES OF THE RIGHT BUTTOCK AND OF THE ADJOINING PORTION OF THE RIGHT THIGH.

In the preparation shown in Fig. 1037, the gluteus medius muscle was turned upwards, the posterior or great sacro-sciatic ligament (ligamentum sacrotuberosum) was divided, and, after detaching it from the obturator fascia, its segments were drawn apart, in order to show the internal pudic artery (arteria pudenda interna) in the small sacro-sciatic foramen. By the removal of parts of the great sciatic nerve and the quadratus femoris muscle, the internal circumflex artery and its branches (*ramus profundus arteriæ circumflexæ femoris medialis—see Appendix, note ²²⁴) were displayed beneath the obturator externus muscle. By the removal of part of the femoral attachment (insertion) of the adductor magnus muscle (see Appendix, note ²³¹) the second or middle perforating artery was also displayed.

Arteries of the Buttock.



¹ See note ² to p. 643 and Appendix, note ²³⁴.
⁵ One of these branches, which has an inward course after perforating the great sacrosclatic ligament, is distinguished by English anatomists as the *coccygeal branch of the sciatic artery*.—Tr.

² See Appendix, note ²³⁵.

³ See Appendix, note ²³⁶.

⁴ See Appendix, note ¹³⁹.

FIG. 1040.—TOPOGRAPHICAL ANATOMY OF THE BUTTOCK AND THE HAM; THE CUTANEOUS ARTERIES OF THE POSTERO-EXTERNAL PART OF THE RIGHT THIGH; SEEN FROM BEHIND.

Arteries of the Buttock, the Back of the Thigh, and the Ham.

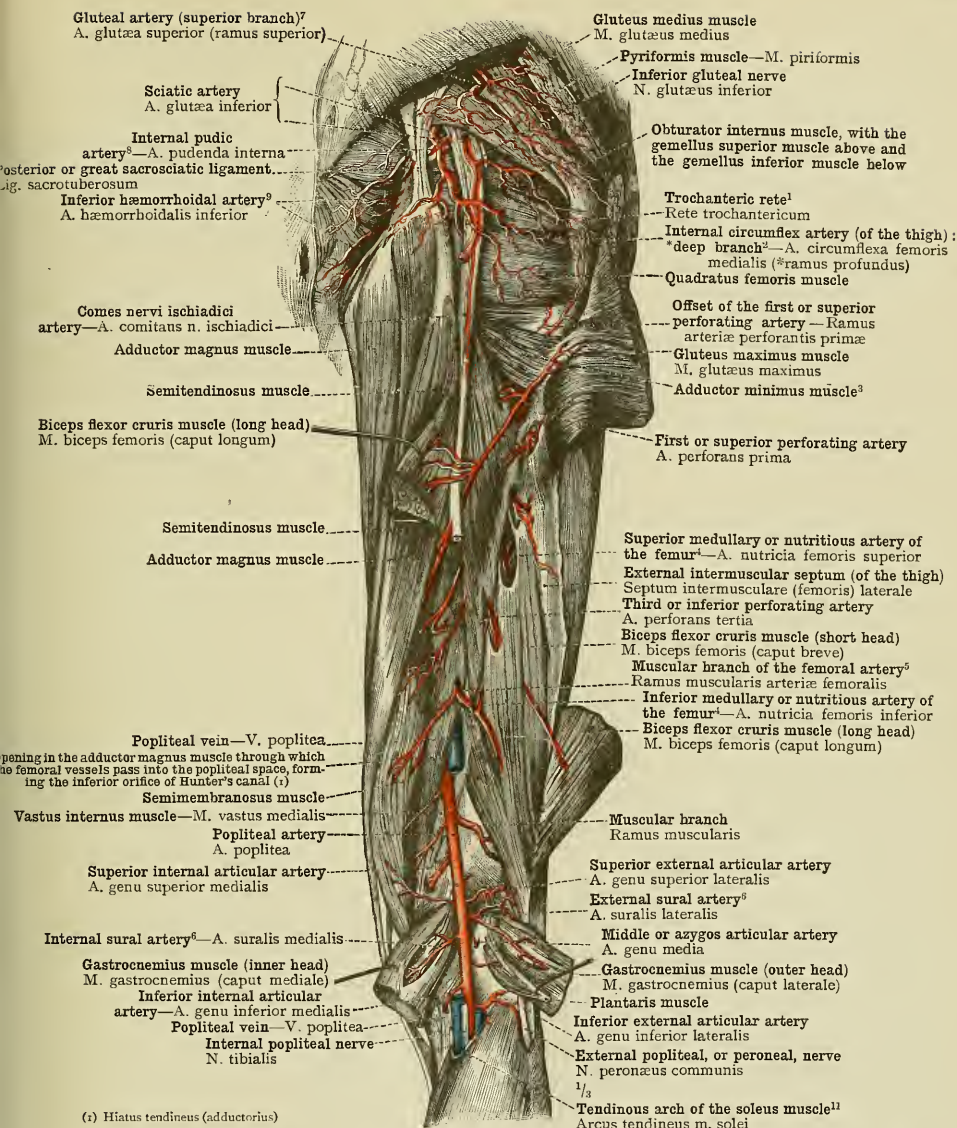


FIG. 1041.—THE DEEP ARTERIES OF THE BUTTOCK; THE PERFORATING ARTERIES, ARTERIE PERFORANTES; THE POPLITEAL ARTERY, ARTERIA POPLITEA, FROM THE OPENING IN THE ADDUCTOR MAGNUS MUSCLE TO THE ENTRY OF THE ARTERY INTO THE *POPLITEAL CANAL, *CANALIS POPLITEUS¹⁰; THE MUSCULAR AND ARTICULAR BRANCHES OF THE POPLITEAL ARTERY; SEEN FROM BEHIND.

¹ See Appendix, note 230.

² See note 2 to p. 643 and Appendix, note 224.

³ See note 2 to p. 644.

⁴ See Appendix, note 233.

⁵ See Appendix, note 233.

⁶ See Appendix, note 232.

⁷ See Appendix, note 230.

⁸ See Appendix, note 232.

⁹ Quain gives *external hemorrhoidal* as an alternative name for this vessel, while Macalister calls it the *anal artery*.

¹⁰ See Appendix, note 234.

¹¹ See note 7 to p. 363 in Part III.

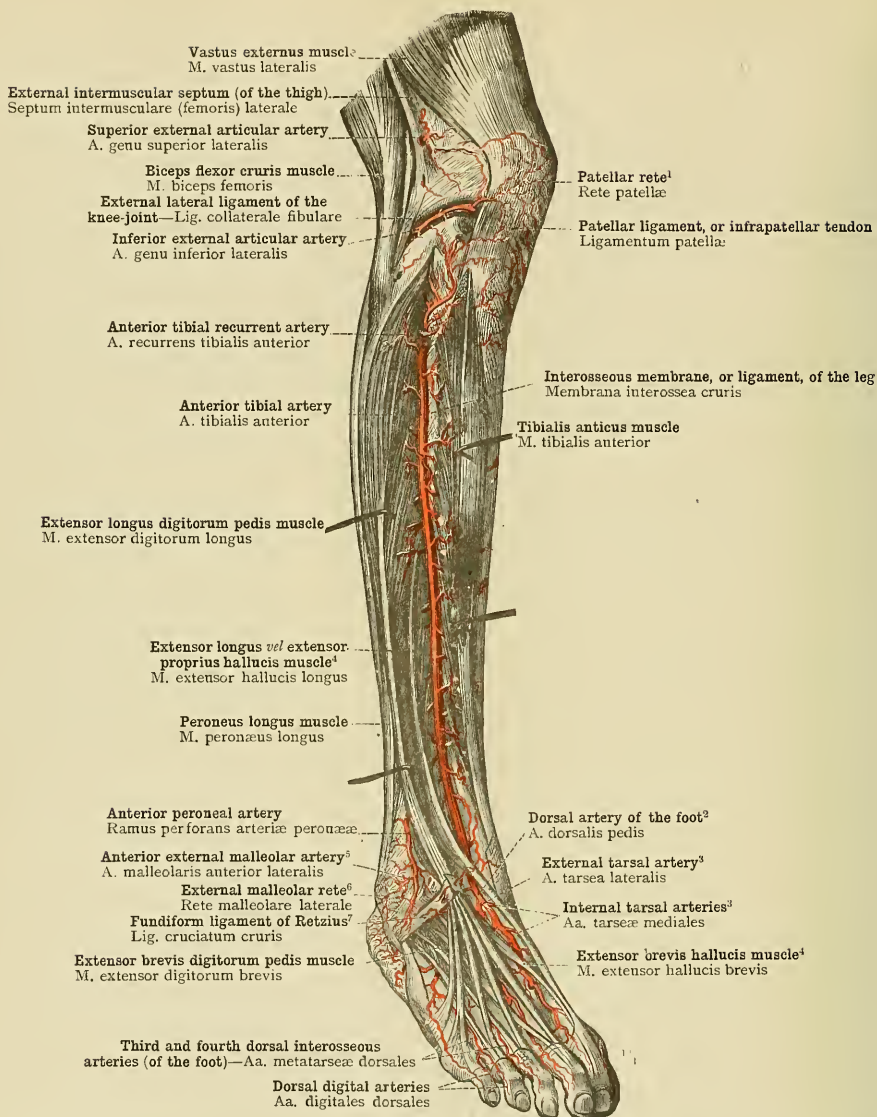


FIG. 1042.—THE ANTERIOR TIBIAL ARTERY AND ITS CONTINUATION INTO THE DORSAL ARTERY OF THE FOOT, OR DORSALIS PEDIS ARTERY.

The tibialis anticus and the extensor longus digitorum pedis muscles have been drawn apart, and the uppermost part of the former has been cut away. The anterior annular ligament of the ankle has been divided by a longitudinal incision, and its outer limb (fundiform ligament of Retzius⁷) has been raised from the subjacent tendons of the extensor longus digitorum pedis and peroneus tertius muscles.

¹ See Appendix, note 227.

² Often known in England by its Latin name of *dorsalis pedis artery*.

³ See Appendix, note 235.

⁴ See note 2 to p. 364 in Part III.

⁵ See Appendix, note 236.

⁶ See Appendix, note 237.

⁷ See Appendix, note 238.

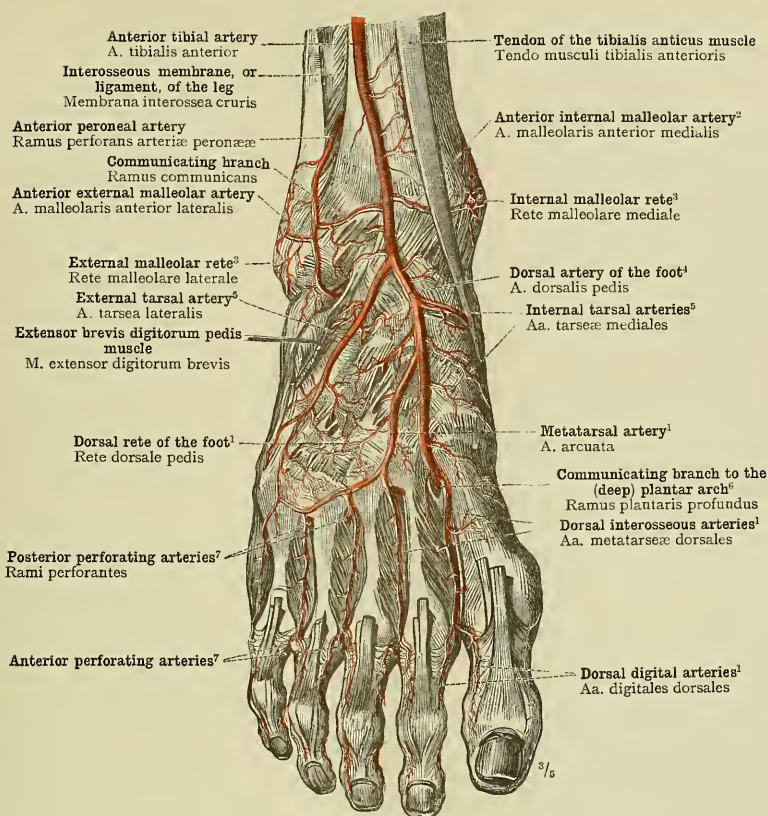
¹ See Appendix, note 239.² See Appendix, note 236.³ See Appendix, note 237.⁴ Often known in England by its Latin name of *dorsalis pedis* artery.⁵ See Appendix, note 235.⁶ See Appendix, note 240.⁷ See Appendix, note 241.

FIG. 1043.—THE DISTAL EXTREMITY OF THE ANTERIOR TIBIAL ARTERY, ITS COMMUNICATION WITH THE ANTERIOR PERONEAL ARTERY (RAMUS PERFORANS ARTERIÆ PERONÆ) AND ITS CONTINUATION INTO THE DORSAL ARTERY OF THE FOOT (ARTERIA DORSALIS PEDIS); THE ANTERIOR EXTERNAL AND ANTERIOR INTERNAL MALLEOLAR ARTERIES (ARTERIÆ MALLEOLARES ANTERIORES, MEDIALIS ET LATERALIS); THE EXTERNAL AND INTERNAL MALLEOLAR RETIA; THE EXTERNAL TARSAL ARTERY (ARTERIA TARSEA LATERALIS) AND THE INTERNAL TARSAL ARTERIES (ARTERIÆ TARSEÆ MEDIALES); THE METATARSAL ARTERY (ARTERIA ARCUATA); THE DORSAL ARTERIAL RETE OF THE FOOT; THE COMMUNICATING BRANCH OF THE DORSAL ARTERY OF THE FOOT TO THE DEEP PLANTAR ARCH OR FIRST POSTERIOR PERFORATING ARTERY (RAMUS PLANTARIS PROFUNDUS ARTERIÆ DORSALIS PEDIS—see Appendix, note 240); THE DORSAL INTEROSSEOUS ARTERIES (ARTERIÆ METATARSEÆ DORSALES), AND THEIR CONNECTIONS WITH THE POSTERIOR PERFORATING OFFSETS (RAMI PERFORANTES) OF THE DEEP PLANTAR ARCH; THE DORSAL DIGITAL ARTERIES (ARTERIÆ DIGITALES DORSALES), AND THEIR ANASTOMOSES WITH THE PLANTAR DIGITAL ARTERIES (THESE ANASTOMOSES BEING THE ANTERIOR PERFORATING ARTERIES OF ENGLISH ANATOMISTS—see Appendix, note 241). THE RIGHT FOOT WITH THE DISTAL EXTREMITY OF THE LEG; SEEN FROM THE DORSAL SIDE.

The extensor muscles of the toes were removed as far down as the heads of the metatarsal bones and the peroneus tertius muscle was cut completely away, in order to lay bare the arteries on the dorsum of the foot.

Arteries of the Dorsum of the Foot.

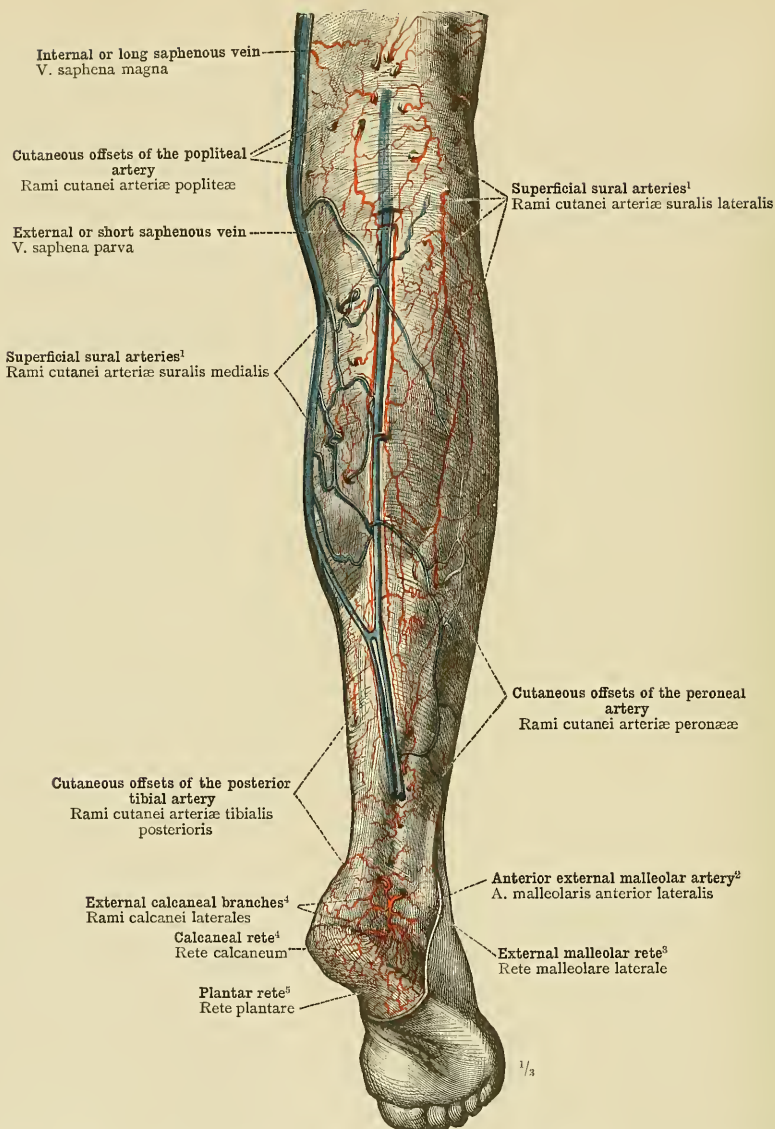
¹ See Appendix, note 232.² See Appendix, note 236.³ See Appendix, note 237.⁴ See Appendix, note 242.⁵ See Appendix, note 243.

FIG. 1044.—THE SUBCUTANEOUS ARTERIES OF THE CALF AND OF THE POPLITEAL REGION IN ADDITION TO PORTIONS OF THE INTERNAL OR LONG AND THE EXTERNAL OR SHORT SAPHEOUS VEINS (VENA SAPHENA MAGNA ET VENA SAPHENA PARVA); THE CALCANEAL AND MALLEOLAR RETIA; THE POSTERIOR PORTION OF THE PLANTAR RETE. RIGHT LEG AND FOOT; SEEN FROM BEHIND AND THE OUTER SIDE.

Arteries of the Back of the Leg.

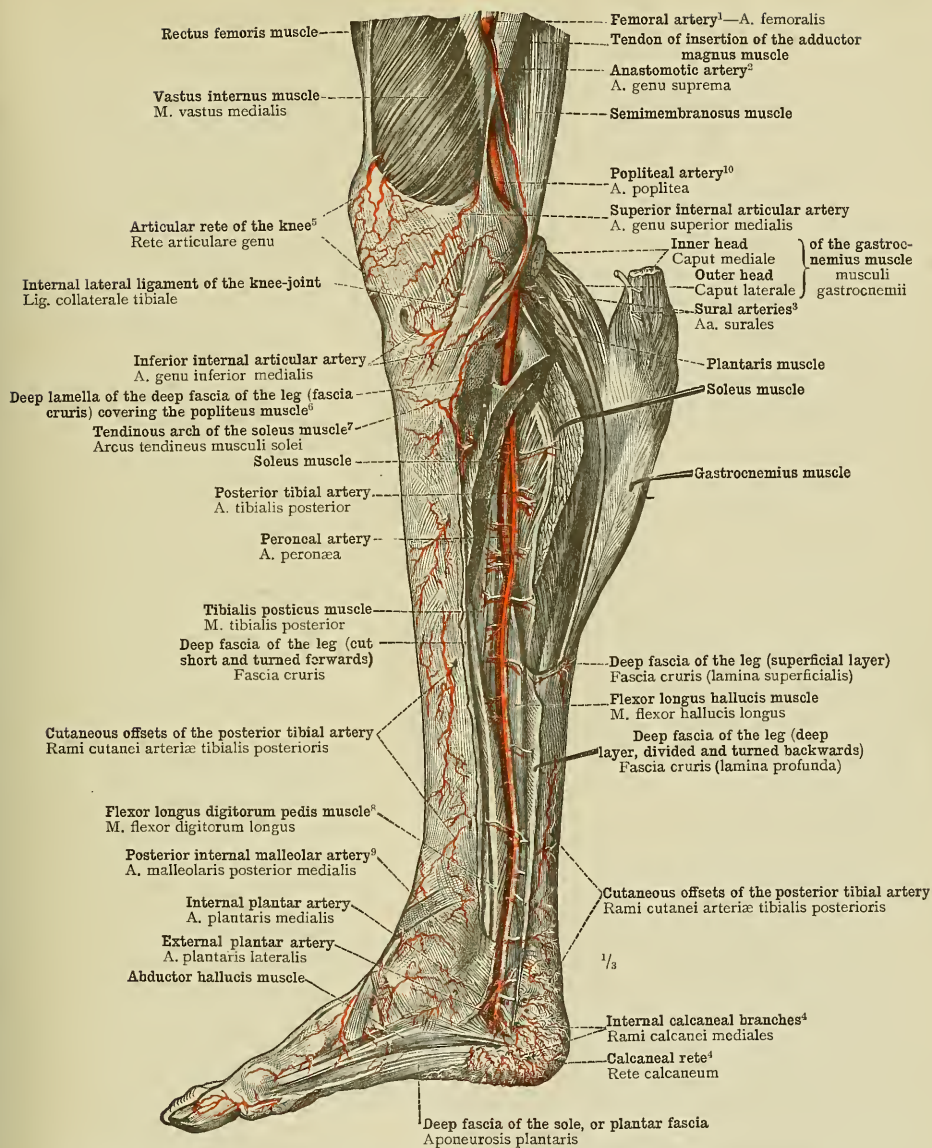
¹ See Appendix, note 223.⁵ See note 5 to p. 642.⁸ Or *flexor perforans* muscle.² See Appendix, note 226.⁶ See Appendix, note 244.⁹ See Appendix, note 236.³ See Appendix, note 237.⁷ See note 7 to p. 363 in Part III.¹⁰ See Appendix, note 245.⁴ See Appendix, note 242.

FIG. 1045.—THE POPLITEAL ARTERY, ITS PASSAGE THROUGH THE *POPLITEAL CANAL (see Appendix, note 245), AND THE POSTERIOR TIBIAL ARTERY.

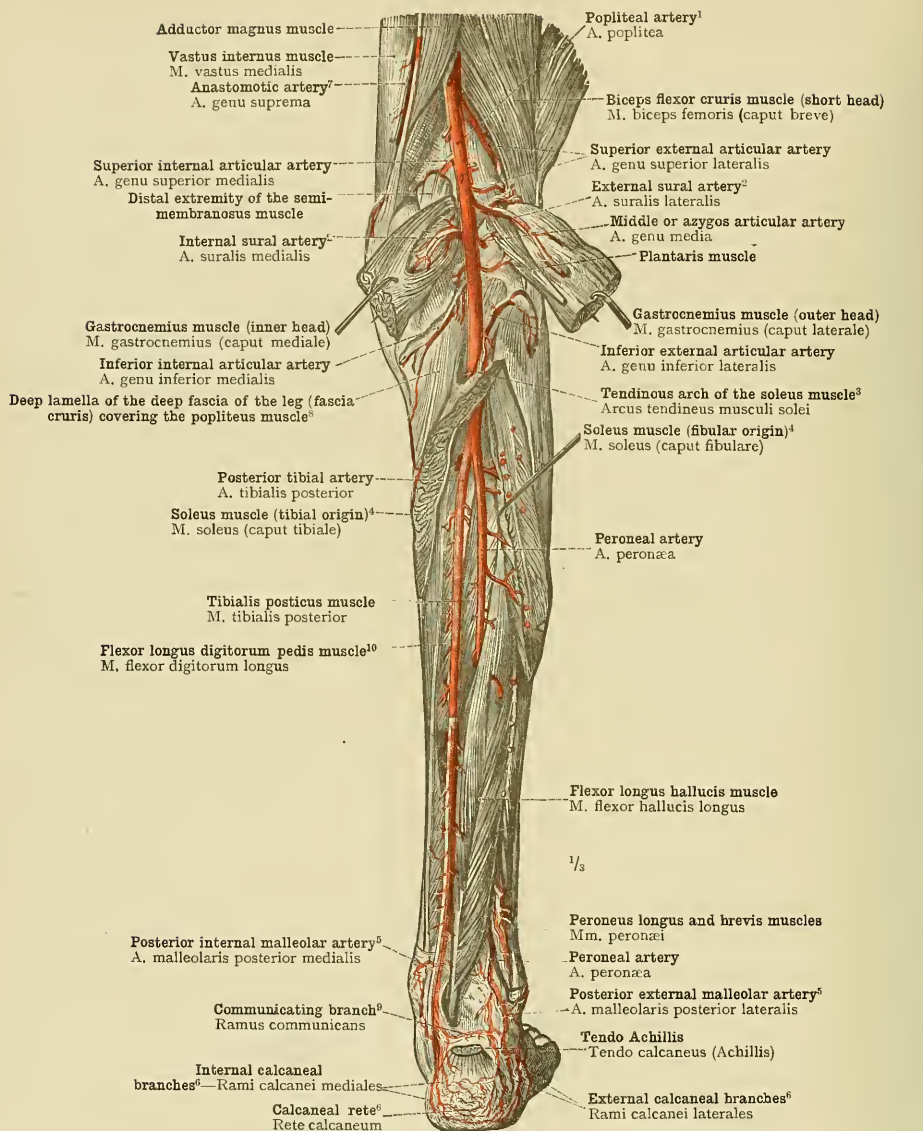
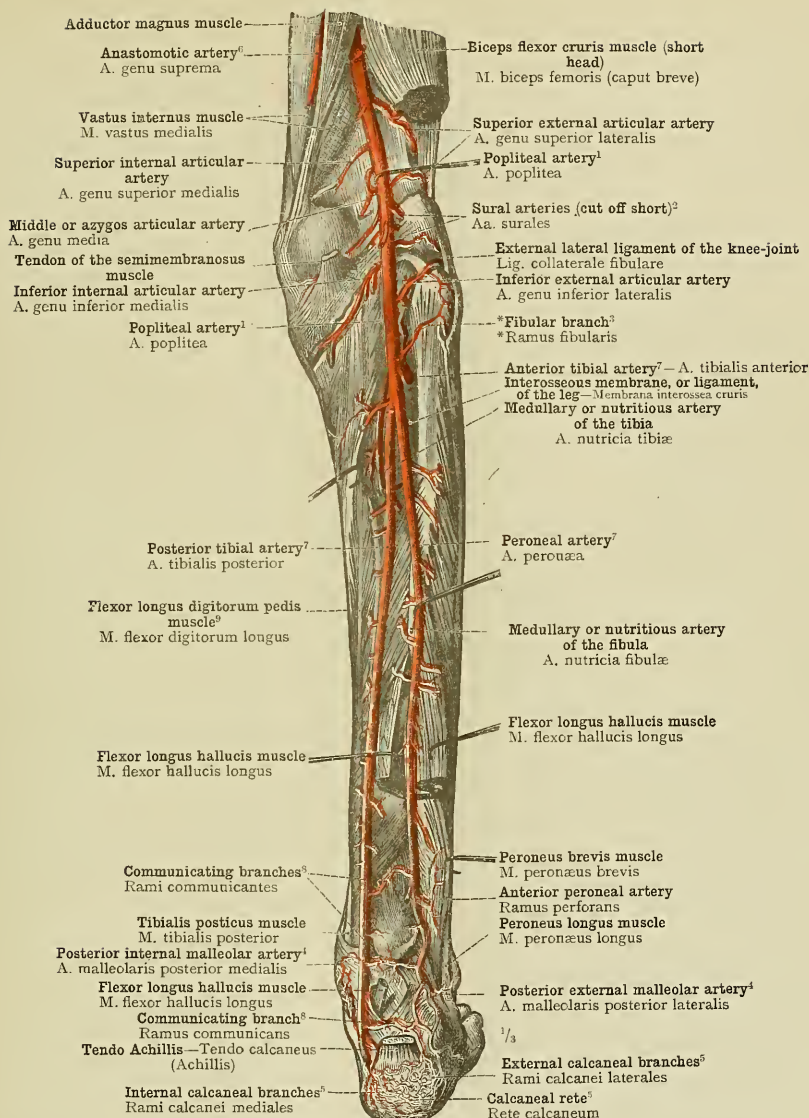
¹ See Appendix, note 245.² See Appendix, note 232.³ See note 7 to p. 363 in Part III.⁴ See Appendix, note 246.⁵ See Appendix, note 236.⁶ See Appendix, note 247.⁷ See Appendix, note 245.⁸ See Appendix, note 244.⁹ See Appendix, note 247.¹⁰ Or *flexor perforans* muscle.

FIG. 1046.—THE POPLITEAL ARTERY, ARTERIA POPLITEA; ITS PASSAGE THROUGH THE *POPLITEAL CANAL, CANALIS POPLITEUS (see Appendix, note 245); THE POSTERIOR TIBIAL ARTERY AND THE PERONEAL ARTERY. RIGHT LEG AND FOOT, SEEN FROM BEHIND.



¹ See Appendix, note 245.
⁶ See Appendix, note 226.

² See Appendix, note 232.
⁷ See Appendix, note 240.

³ See Appendix, note 248.
⁸ See Appendix, note 247.

⁴ See Appendix, note 236.
⁹ Or flexor perforans muscle.

⁵ See Appendix, note 242.

FIG. 1047.—THE ARTICULAR BRANCHES OF THE POPLITEAL ARTERY; THE ORIGIN OF THE ANTERIOR TIBIAL ARTERY (see Appendix, note 240); THE MEDULLARY OR NUTRITIVE ARTERIES OF THE TIBIA AND THE FIBULA, ARTERIÆ NUTRICIÆ TIBIÆ ET FIBULÆ; THE TERMINAL DIVISION OF THE PERONEAL ARTERY. RIGHT LEG AND FOOT, SEEN FROM BEHIND.

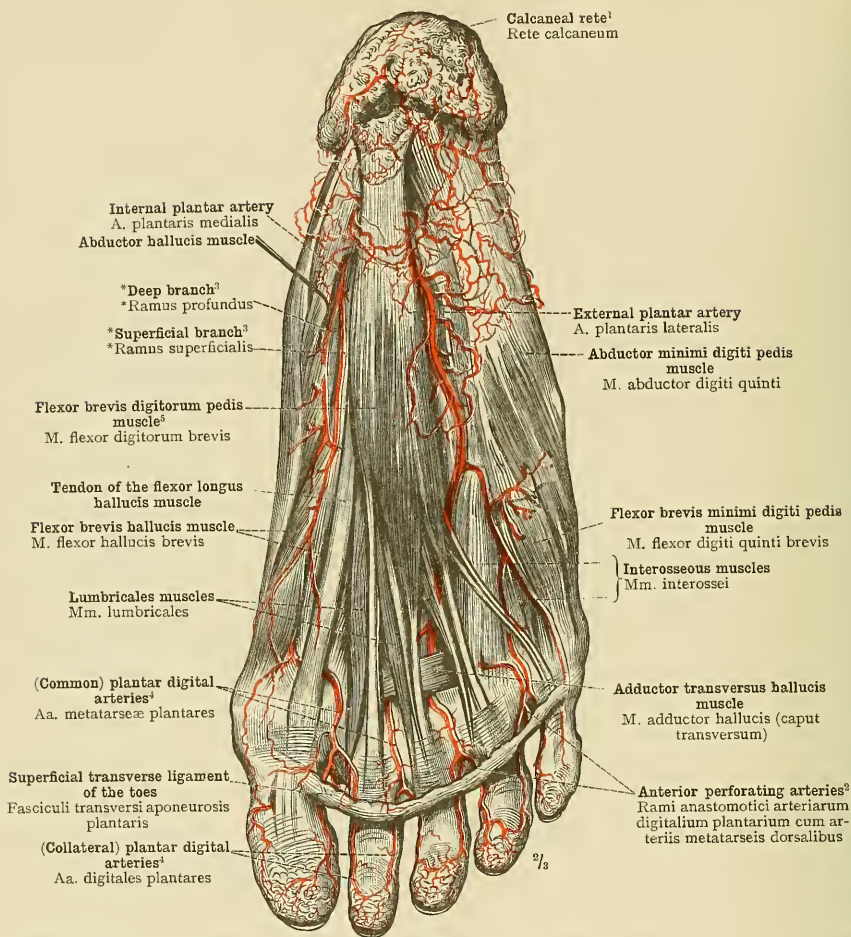
¹ See Appendix, note 242.² See Appendix, note 242.³ See Appendix, note 259.⁴ See Appendix, note 253.⁵ Or *flexor perforatus* muscle.

FIG. 1048.—SUPERFICIAL ARTERIES OF THE SOLE OF THE FOOT: THE CALCANEAL RETE, RETE CALCANEUM (see Appendix, note 242), AND PART OF THE PLANTAR RETE (see Appendix, note 243); THE EXTERNAL PLANTAR ARTERY, ARTERIA PLANTARIS LATERALIS, AND ITS SUPERFICIAL DISTRIBUTION; THE INTERNAL PLANTAR ARTERY, ARTERIA PLANTARIS MEDIALIS, AND ITS DIVISION INTO *SUPERFICIAL AND *DEEP BRANCHES, *RAMUS SUPERFICIALIS ET *RAMUS PROFUNDUS (see Appendix, note 259); THE (COMMON) PLANTAR DIGITAL ARTERIES, ARTERIÆ METATARSEÆ PLANTARES (see Appendix, note 251); THE (COLLATERAL) PLANTAR DIGITAL ARTERIES, ARTERIÆ DIGITALES PLANTARES (see Appendix, note 251), AND THE ANTERIOR PERFORATING ARTERIES (see Appendix, note 241). PLANTAR ASPECT OF THE RIGHT FOOT.

The deep fascia of the sole or plantar fascia (aponeurosis plantaris) was removed, except for the superficial transverse ligament of the toes (fasciculi transversi aponeurosis plantaris); in the heel, the subcutaneous pad of fat was left intact.

Arteries of the Sole of the Foot.

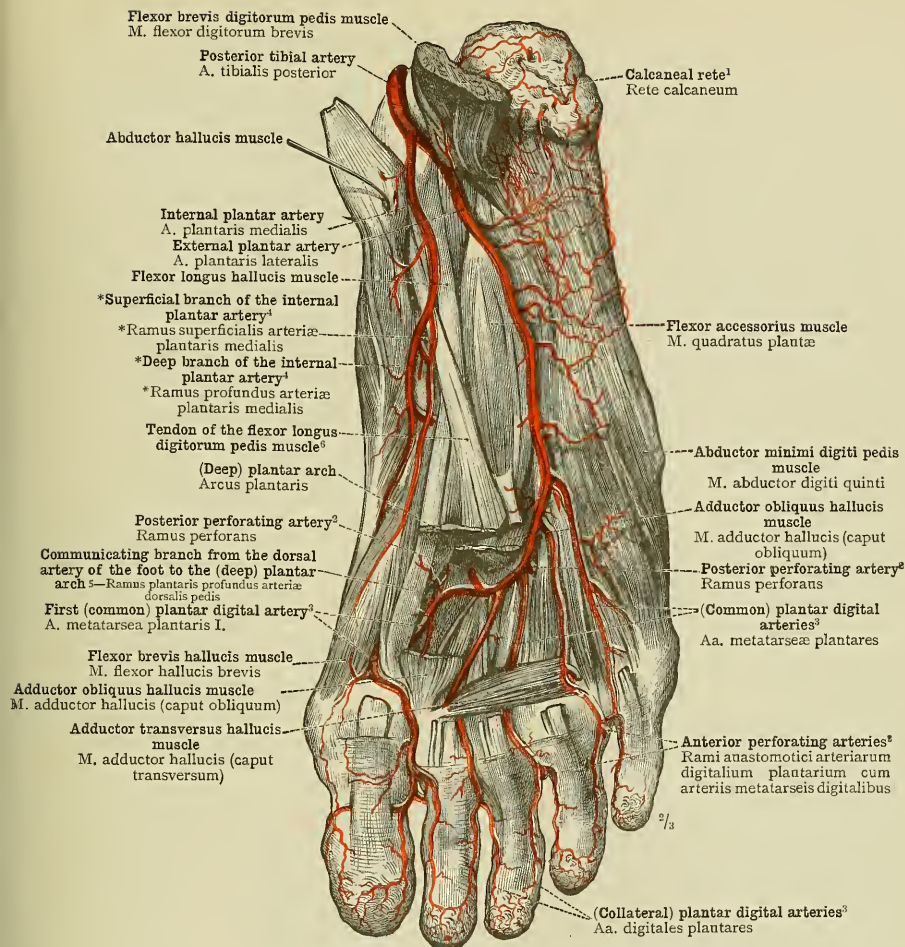


FIG. 1049.—DEEP ARTERIES OF THE SOLE OF THE FOOT: THE (DEEP) PLANTAR ARCH⁷; THE COMMON³ AND THE COLLATERAL³ PLANTAR DIGITAL ARTERIES.

In the preparation shown in Fig. 1048, in order to expose fully the two terminal branches of the posterior tibial artery, the abductor hallucis muscle was detached from the os calcis and turned outwards, the short flexor of the toes was cut across near its hinder extremity, its proximal segment being turned backwards, and its distal segment cut away as far forward as the heads of the metatarsal bones. After the partial removal of the tendons of the long flexor of the toes and of the long flexor of the great toe as well as of the adductor obliquus hallucis, the (deep) plantar arch was exposed, together with the posterior perforating and the (common) plantar digital arteries.

¹ See Appendix, note 242.

² See Appendix, note 244.

³ See Appendix, note 251.

⁴ See Appendix, note 259.

⁵ Or first posterior perforating artery—see Appendix, note 249.

⁶ Or flexor perforans muscle.

⁷ (Deep) Plantar Arch.—This is most commonly spoken of as the plantar arch, without qualification. Toldt also calls it simply *arcus (arteriosus) plantaris*. Some authorities, however, describe also a *superficial plantar arch*. (See Appendix, note 259.)—Tr.

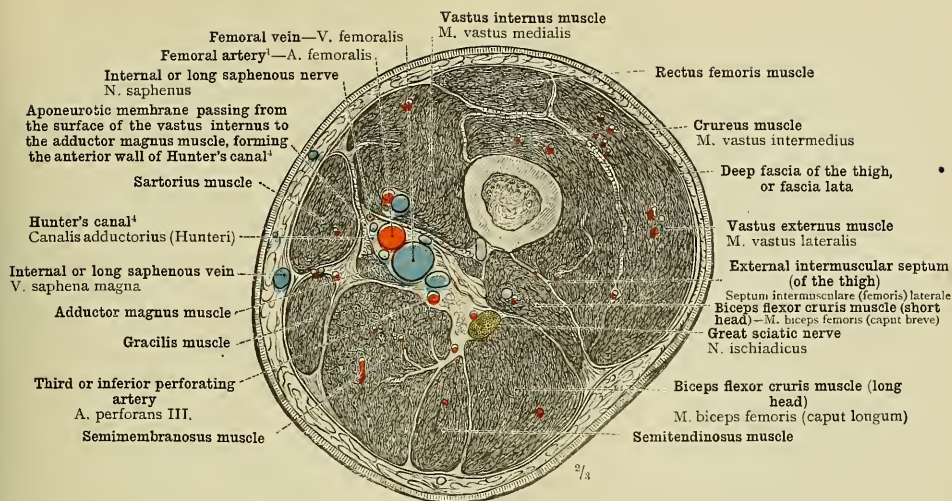


FIG. 1052.—TRANSVERSE SECTION THROUGH THE RIGHT THIGH, A LITTLE ABOVE THE OPENING IN THE ADDUCTOR MAGNUS MUSCLE THROUGH WHICH THE FEMORAL VESSELS PASS INTO THE POPLITEAL SPACE (HIATUS ADDUCTORIUS HUNTERI); UPPER SURFACE OF LOWER SEGMENT.

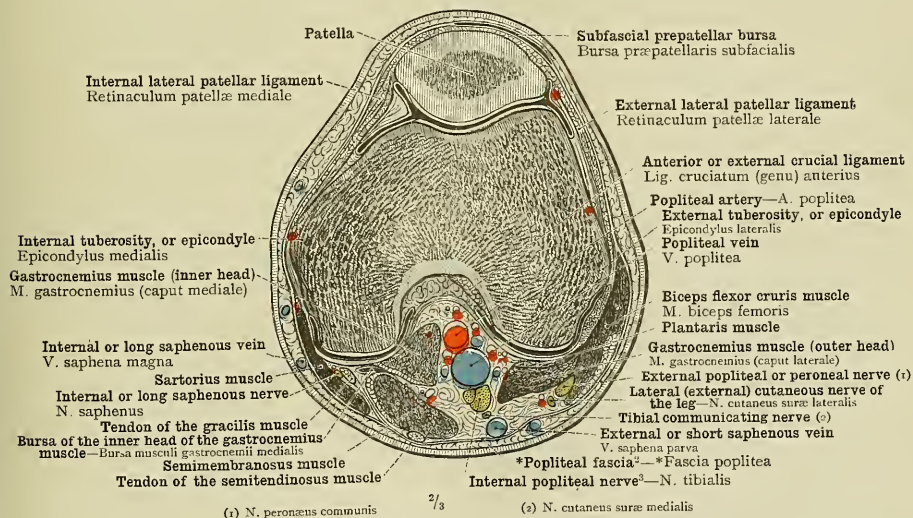


FIG. 1053.—TRANSVERSE SECTION THROUGH THE RIGHT KNEE, PASSING THROUGH THE MIDDLE OF THE PATELLA; UPPER SURFACE OF LOWER SEGMENT.

¹ See Appendix, note 223.

² *Popliteal Fascia.—The name of *fascia poplitea* is given by the author to that portion of the deep fascia of the lower extremity which forms the roof of the popliteal space. The name is not used by Quain or Macalister.—Tr.

³ See Appendix, note 224.

⁴ See Appendix, note 228.

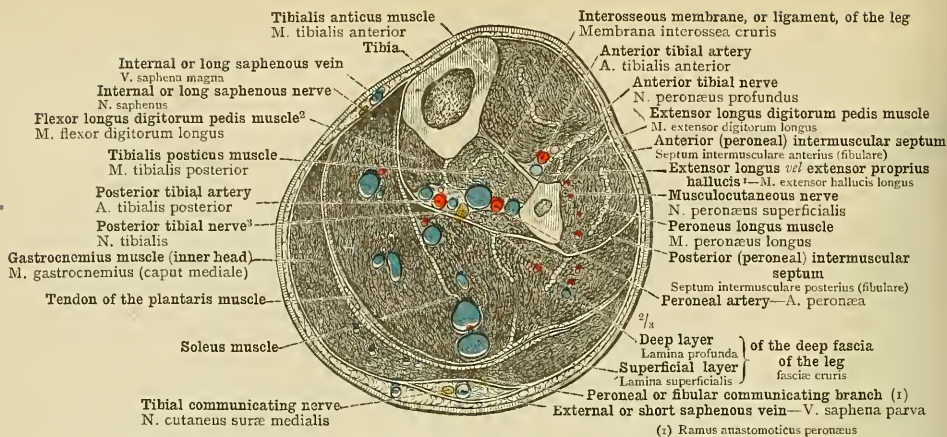


FIG. 1054.—TRANSVERSE SECTION THROUGH THE RIGHT LEG, A LITTLE ABOVE THE MIDDLE; UPPER SURFACE OF LOWER SEGMENT.

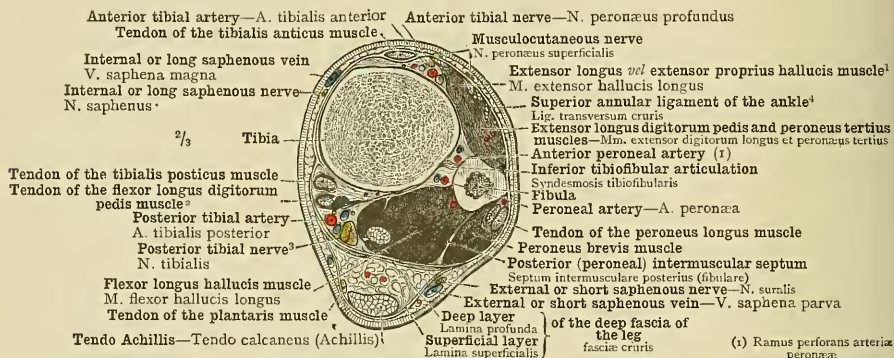
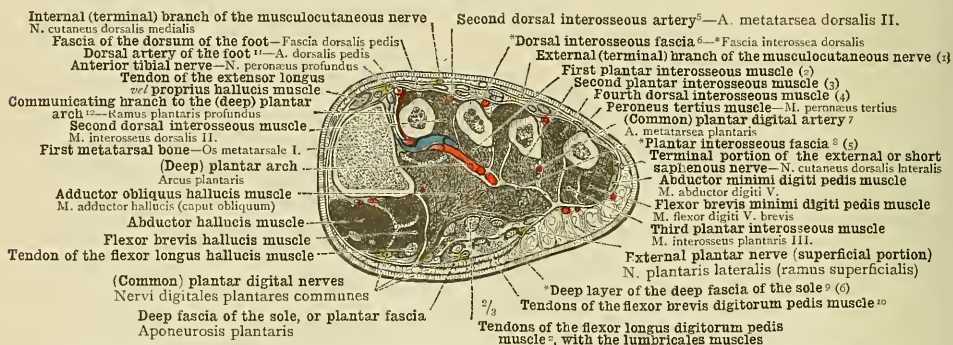


FIG. 1055.—TRANSVERSE SECTION THROUGH THE RIGHT LEG, JUST ABOVE THE ANKLE-JOINT; UPPER SURFACE OF LOWER SEGMENT.



- (1) N. cutaneus dorsalis intermedius (2) M. interossea plantaris I. (3) M. interossea plantaris II. (4) M. interossea dorsalis IV.
(5) Fascia interossea plantaris (6) Fascia plantaris profunda

FIG. 1056.—CORONAL SECTION THROUGH THE RIGHT FOOT, PASSING THROUGH THE MIDDLE OF THE FIRST METATARSAL BONE; SURFACE OF DISTAL SEGMENT.

¹ Regarding the nomenclature of this muscle, see note 2 to p. 364, in Part III.

² See Appendix, note 254.

³ See Appendix, note 239.

⁴ See Appendix, note 255.

⁵ See Appendix, note 257.

⁶ Often known in England by its Latin name of *dorsalis pedis artery*.

⁷ Or *flexor perforans muscle*.

⁸ Known also as the *upper band of the anterior annular ligament of the ankle*.

⁹ See Appendix, note 251.

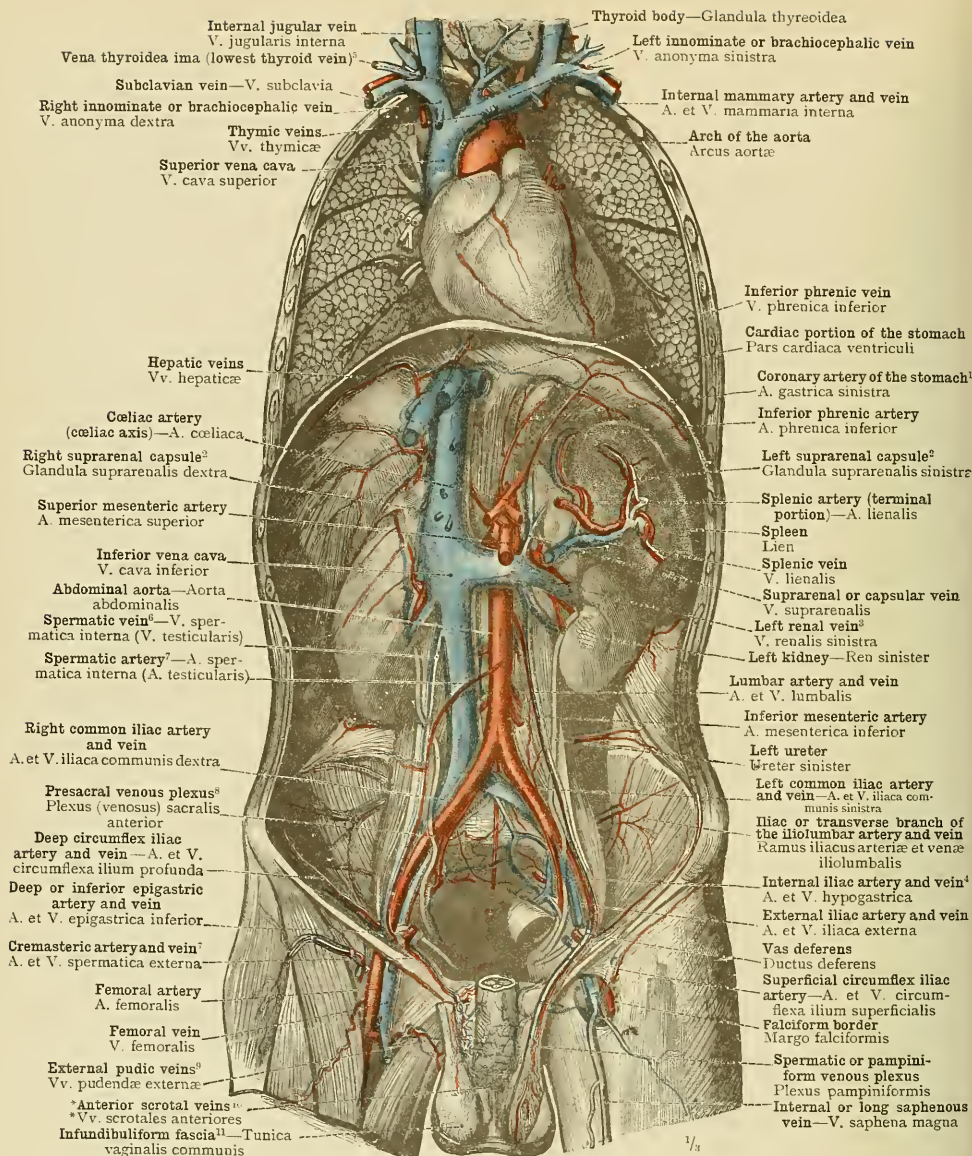
¹⁰ Or *flexor perforans muscle*.

¹¹ See Appendix, note 249.

¹² See Appendix, note 249.

VENÆ TRUNCI

THE VEINS OF THE TRUNK



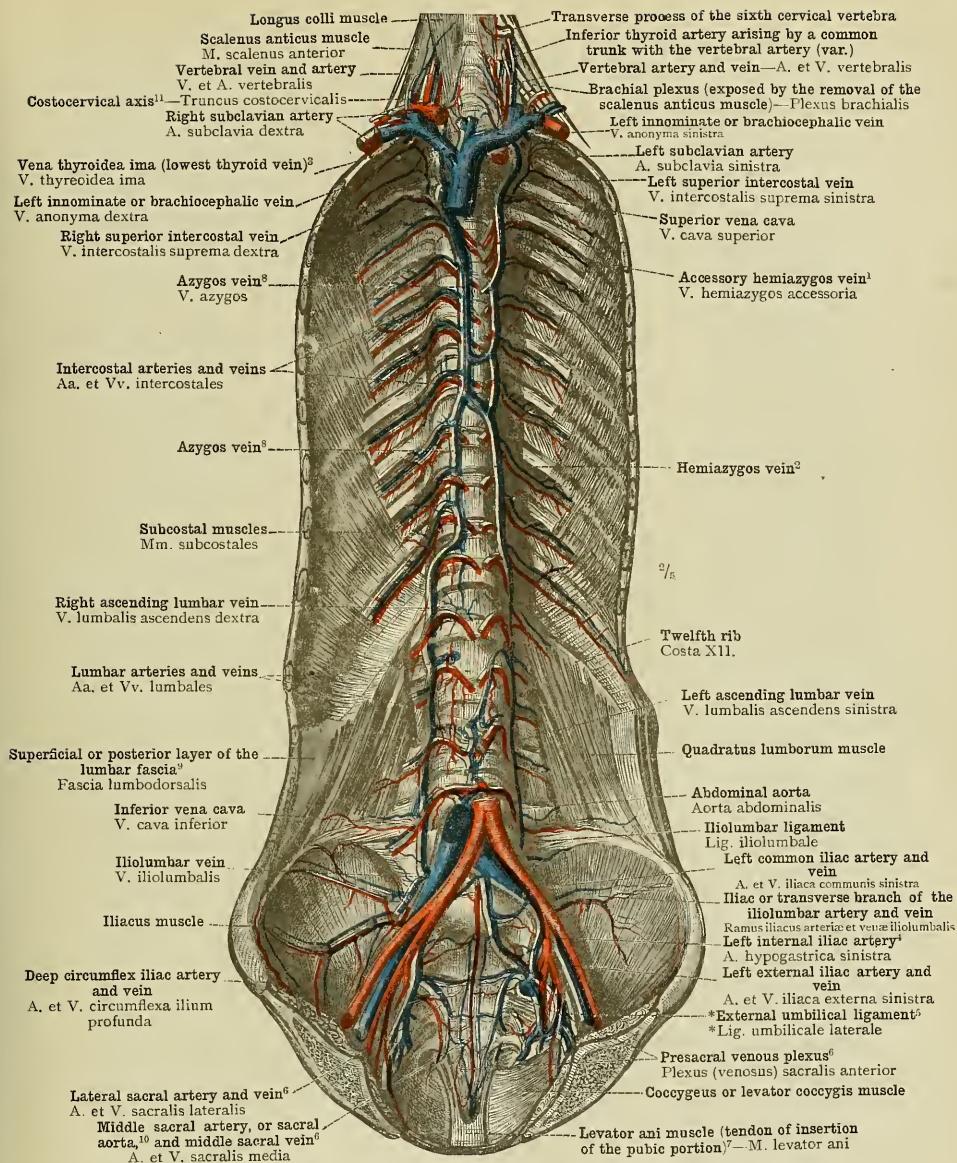
¹ Called by Macalister the gastric artery.
² Sometimes called the *cutaneous veins*. See note 3 to p. 595.
³ Companion to the *thyroidea ima* artery. See note 1 to p. 590.
⁴ This vein is called by the author *vena spermatica interna* to distinguish it from the *vena spermatica externa*—the cremasteric vein of English anatomists.—17c.
⁵ See Appendix, note 129.
⁶ Called by Macalister the *pubic veins*. See note on nomenclature of corresponding arteries (note 5 to p. 599).
⁷ See Appendix, note 131.
⁸ See Appendix, note 258.
⁹ See Appendix to Part IV., note 68.

² Called also *suprarenal body*, or *adrenal*.

⁴ See Appendix, note 129.

FIG 1057—THE SUPERIOR AND THE INFERIOR VENA CAVA; THE PARIETAL AND THE VISCERAL TRIBUTARIES, RADICES PARIETALES ET VISCERALES, OF THE LATTER. THE ABDOMINAL AORTA, AORTA ABDOMINALIS. SEEN FROM BEFORE.

The System of the Superior and the Inferior Venæ Cavæ.



¹ Called also the *left upper azygos vein*.

² Companion to the *thyroidea ima artery*. See note ¹ to p. 599.

³ The remains of the obliterated *hypogastric artery* of the fetus.—See note 4 to p. 387, in Part III.

⁴ That portion of the levator ani muscle which is distinguished by Toldt as the *pars publica* is by Savage called the *pubococcygeus* muscle. See note 6 to p. 599, in Part IV.

⁵ Called also the *right or large azygos vein*.

⁶ See Appendix, note 127.

⁷ Known also as the *left lower or small azygos vein*.

⁸ See Appendix, note 129.

⁹ See note 4 to p. 387, in Part III.

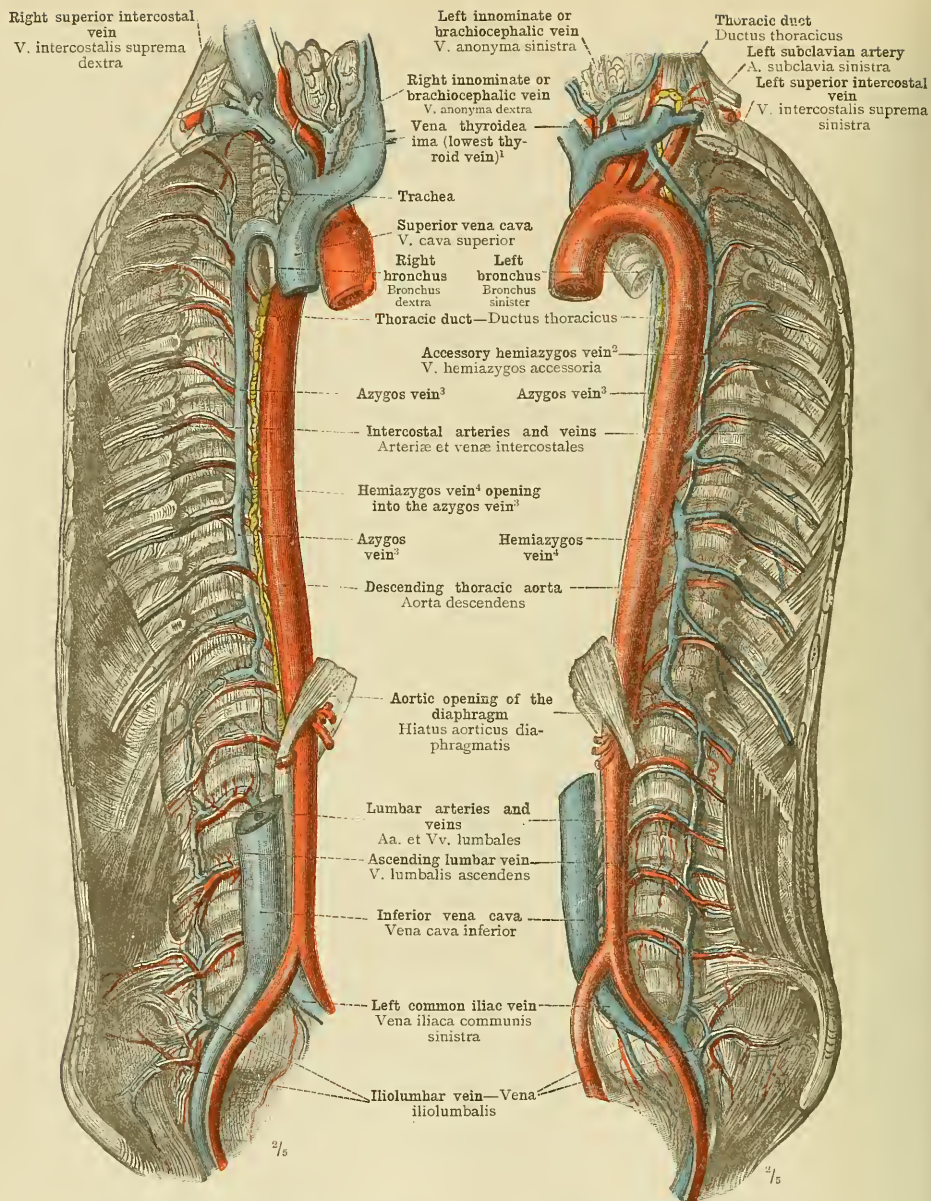
¹⁰ See Appendix, note 238.

¹¹ See note ¹ to p. 267 and note ¹ to p. 285, in Part III.

¹² See Appendix, note 127.

FIG. 1058.—THE VEINS ON THE INNER SURFACE OF THE POSTERIOR WALL OF THE TRUNK. SEEN FROM BEFORE.

The System of the Azygos and Hemiazygos Veins.



¹ Companion to the *thyroidea ima* artery. See note ¹ to p. 590.

³ Known also as the *right or large azygos vein*.

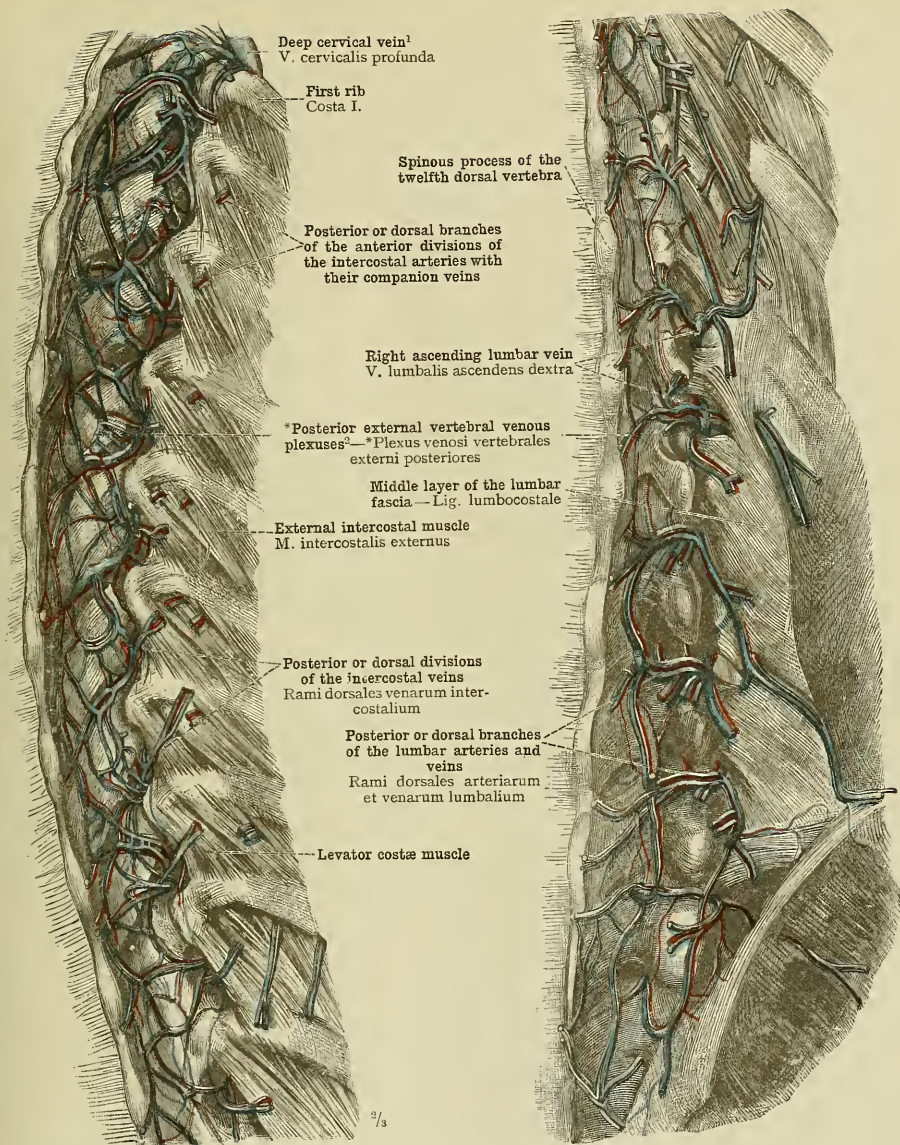
² Known also as the *left upper azygos vein*.

⁴ Known also as the *left lower or small azygos vein*.

FIG. 1059.—SEEN FROM THE RIGHT SIDE.

FIG. 1060.—SEEN FROM THE LEFT SIDE.

The System of the Azygos and Hemiazygos Veins.



¹ Known also as the *posterior vertebral vein*.

See Appendix, notes 259 and 260.

FIG. 1061.—*POSTERIOR EXTERNAL VERTEBRAL VENOUS PLEXUS (see Appendix, notes 259 and 260) OF THE DORSAL REGION.

FIG. 1062.—*POSTERIOR EXTERNAL VERTEBRAL VENOUS PLEXUS (see Appendix, notes 259 and 260) OF THE LUMBAR AND SACRAL REGIONS.

Plexus venosi vertebrales externi posteriores—The posterior external vertebral venous plexuses.

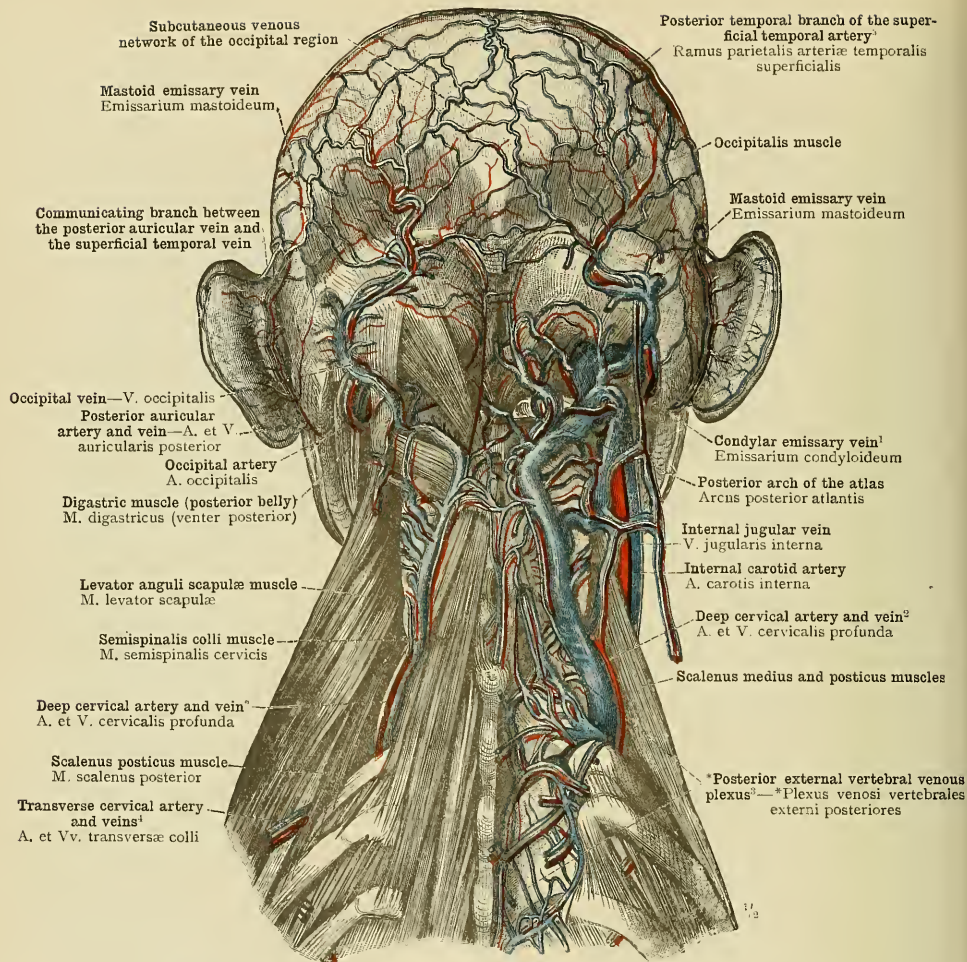
¹ See Appendix, note 264.² See Appendix, notes 259 and 260.³ See Appendix, note 168.⁴ The deep cervical vein is known also as the posterior vertebral vein.⁵ See Appendix, note 262.

FIG. 1063.—THE VEINS OF THE OCCIPITAL REGION AND THE DEEP VEINS OF THE BACK OF THE NECK, SEEN FROM BEHIND: THE SUBCUTANEOUS VENOUS NETWORK OF THE OCCIPITAL REGION; THE OCCIPITAL VEIN, VENA OCCIPITALIS, CONTINUOUS BELOW WITH THE DEEP CERVICAL VEIN, VENA CERVICALIS PROFUNDA; THE MASTOID EMISSARY VEIN, EMISSARIUM MASTOIDEUM, AND THE CONDYLAR EMISSARY VEIN, EMISSARIUM CONDYLOIDEUM (see Appendix, note 261); THE *POSTERIOR EXTERNAL VERTEBRAL VENOUS PLEXUS, *PLEXUS VENOSI VERTEBRALES EXTERNI POSTERIORES (see Appendix, notes 259 and 260); THE POSTERIOR AURICULAR VEIN, VENA AURICULARIS POSTERIOR.

On the left side the levator anguli scapulae muscle was drawn outwards, and, after the removal of the complexus or semispinalis capitis muscle, the short posterior craniovertebral or suboccipital muscles and the semispinalis colli muscle were exposed. On the right side these muscles also were removed, and the *posterior external vertebral venous plexus was thus laid bare.

The Deep Veins of the Nuchal and Occipital Regions.

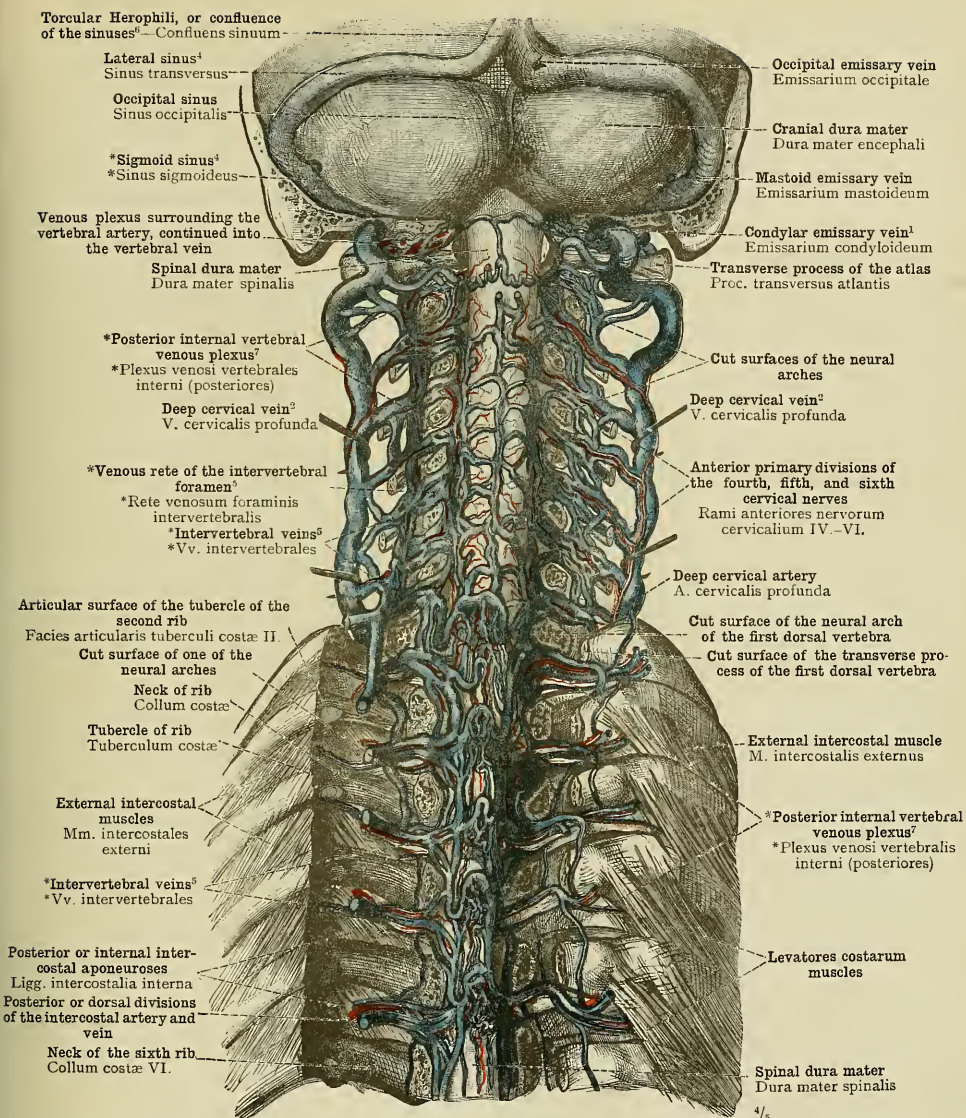


FIG. 1064.—INTERNAL VERTEBRAL VENOUS PLEXUS (see Appendix, notes 260 and 263), LAID BARE FROM BEHIND BY OPENING THE SPINAL CANAL IN THE CERVICAL AND THE UPPER DORSAL PORTIONS OF THE VERTEBRAL COLUMN; THE CONNEXIONS OF THE PLEXUS WITH THE DEEP CERVICAL VEIN (see note ² above) AND WITH THE INTERCOSTAL VEINS. THE VENOUS SINUSES OF THE CRANIUM (MENINGEAL SINUSES), SINUS DURÆ MATRIS.

¹ See Appendix, note 261.

⁴ See Appendix, note 264.

⁷ See Appendix, notes 259 and 263.

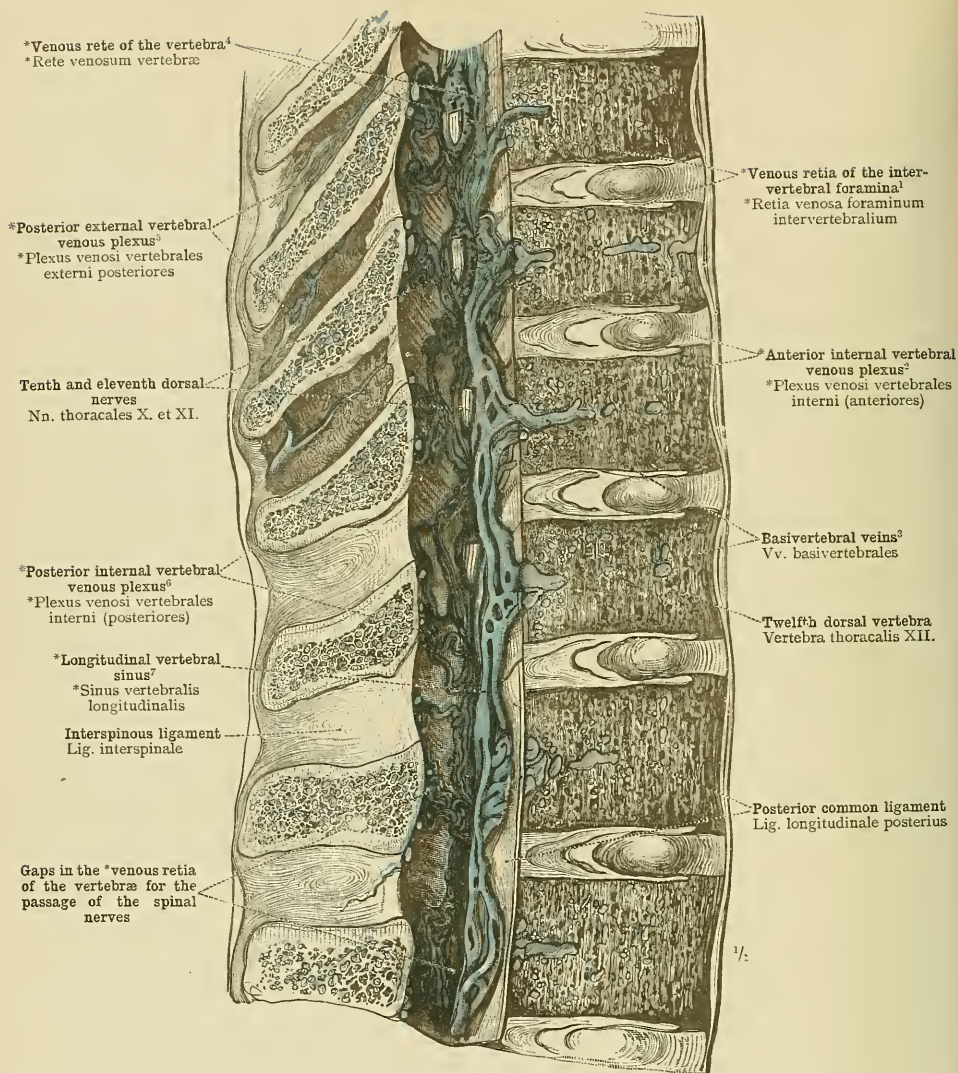
² Known also as the posterior vertebral vein.

⁵ See Appendix, note 265.

³ See Appendix, note 263.

⁶ See Appendix, note 266.

Plexus venosi vertebrales interni—The *internal vertebral venous plexus.—V. cervicalis profunda—The deep cervical vein.



¹ See Appendix, note 265.

⁴ See Appendix, note 269.

⁷ Or anterior longitudinal spinal vein.

² See Appendix, notes 239 and 267.

⁵ See Appendix, notes 239 and 266.

See Appendix, notes 239 and 267.

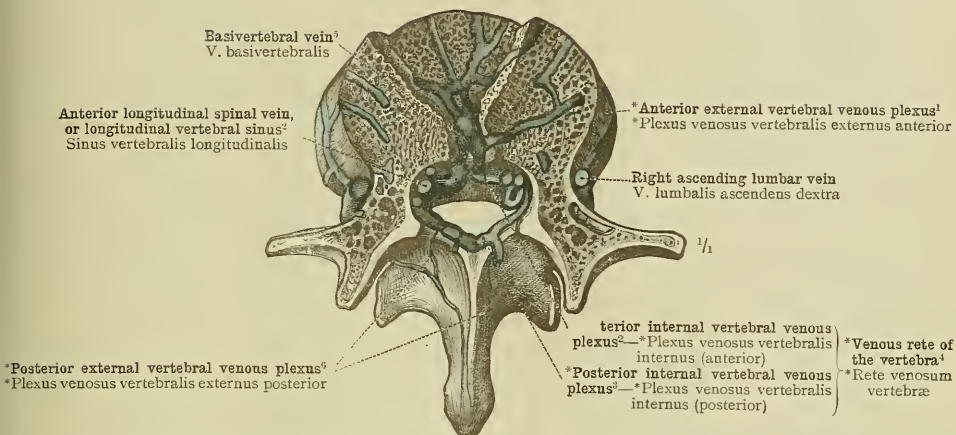
³ See Appendix, note 268.

⁶ See Appendix, notes 239 and 268.

FIG. 1055.—THE *INTERNAL VERTEBRAL VENOUS PLEXUSES, *PLEXUS VENOSI VERTEBRALES INTERNI (see Appendix, notes 239 and 268), DISPLAYED IN THE LEFT HALF OF A MEDIAN SAGITTAL SECTION THROUGH THE FOUR LOWER-MOST DORSAL AND THE TWO UPPER-MOST LUMBAR VERTEBRÆ; THEIR CONNEXION WITH THE BASIVERTEBRAL VEINS, VENÆ BASIVERTEBRALES (see Appendix, note 268), AND THEIR RELATION TO THE EMERGING ROOTS OF THE SPINAL NERVES.

The posterior common ligament was removed from the dorsal vertebrae, but left intact on the lumbar vertebrae. Between the spinous processes of the eighth, ninth, and tenth dorsal vertebrae, by the removal of the interspinous ligaments, portions of the *posterior external vertebral venous plexus have also been exposed.

Plexus venosi vertebrales interni—The internal vertebral venous plexus.



¹ *Anterior External Vertebral Venous Plexus.—Quain calls the veins that combine to form this plexus the *external veins of the bodies of the vertebrae*. According to Von Langer and Toldt, the *plexus venosi vertebrales externi anteriores* are not equally developed throughout the spine, being found only in the cervical and sacral regions. (See also Appendix, notes 239.)—Tr.

² See Appendix, notes 239 and 249.

³ See Appendix, note 269.

⁴ See Appendix, notes 239 and 260.

⁵ See Appendix, note 269.

FIG. 1066.—THE BASIVERTEBRAL VEINS, VENE BASIVERTEBRALES, THEIR CONNEXION WITH THE *ANTERIOR INTERNAL AND THE *ANTERIOR EXTERNAL VERTEBRAL VENOUS PLEXUSES, *PLEXUS VENOSI VERTEBRALES ANTERIORES; AND THE *VENOUS RETE OF THE VERTEBRA, RETE VENOSUM VERTEBRÆ, A SEGMENTAL PORTION OF THE *ANTERIOR INTERNAL AND *POSTERIOR INTERNAL VERTEBRAL VENOUS PLEXUS, *PLEXUS VENOSI VERTEBRALES INTERNI; SEEN FROM ABOVE IN A HORIZONTAL SECTION THROUGH A LUMBAR VERTEBRA.

In order to bring into view the ramifications of the basivertebral veins at different levels, a part of the substance of the body of the vertebra was cut away below the general level of the section.

Vv. basivertebralis.—The basivertebral veins.—Plexus venosi vertebrales.—The vertebral venous plexuses.

Cutaneous offsets of the superficial cervical artery¹
 Rami cutanei arteriæ cervicalis superficialis
 Cutaneous offsets of the suprascapular artery¹—Rami cutanei arteriæ transversæ scapulæ

Cutaneous offset of the posterior circumflex artery (of the arm)⁽¹⁾
 Cutaneous offset of the dorsal branch of the subscapular artery¹—Ramus cutaneus arteriæ circumflexæ scapulæ

(Outer) dorsal cutaneous branches of the intercostal and lumbar arteries—Rami cutanei dorsales (laterales) arteriarum intercostalium et lumbalium

Lateral cutaneous branches of the intercostal arteries¹
 Rami cutanei laterales arteriarum intercostalium

Cutaneous offsets of the gluteal artery
 Rami cutanei arteriæ gluteæ superioris

Cutaneous offsets of the sciatic artery
 Rami cutanei arteriæ gluteæ inferioris

Cutaneous offset of the first or superior perforating artery
 Ramus cutaneus arteriæ perforantis primæ

(Inner) dorsal cutaneous branches of the intercostal arteries—Rami cutanei dorsales (mediales) arteriarum intercostalium

(Inner) dorsal cutaneous branches of the lumbar arteries
 Rami cutanei dorsales (mediales) arteriarum lumbalium

Cutaneous offsets of the dorsal branches of the lateral sacral arteries

$\frac{1}{3}$

Cutaneous offsets of the inferior hæmorrhoidal artery¹ (which is itself a branch of the internal pudic artery)²

(1) Rami cutanei arteriæ circumflexæ humeri posterioris

¹ Called by Macalister the *anal artery*.

² See Appendix, note 139.

³ Regarding the author's use of the term *arteria cervicalis superficialis*, see Appendix, notes 134, 135, 172, and 206.

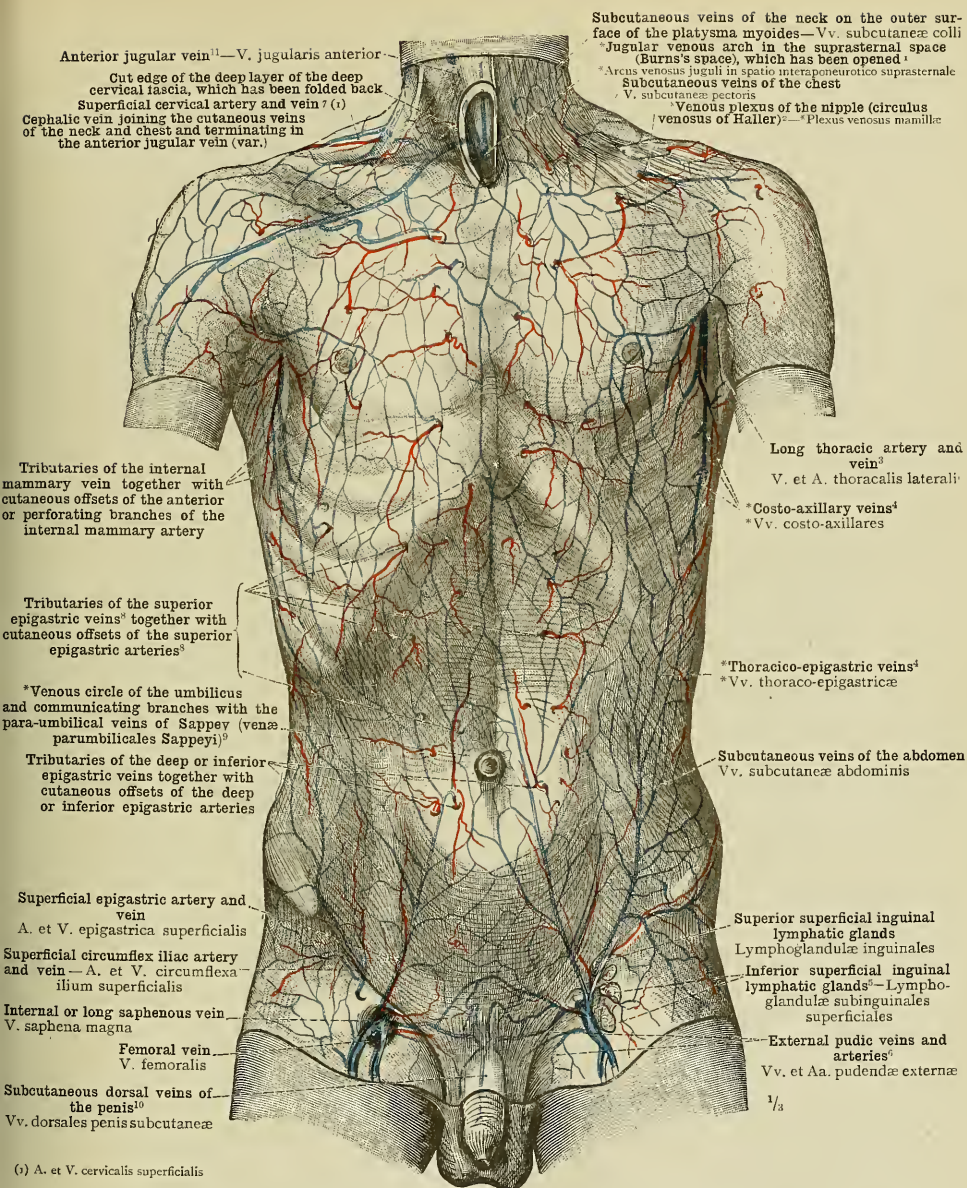
⁴ Called also the *transverse scapular* or *transverse humeral artery*.

⁵ Known also as the *lateral perforating branches*. See note ¹ to p. 589.

⁶ Or *dorsalis scapulæ artery*.

FIG. 1067.—THE SUBCUTANEOUS ARTERIES AND VEINS OF THE POSTERIOR WALL OF THE TRUNK.

The Subcutaneous Bloodvessels of the Posterior Wall of the Trunk.



(1) A. et V. cervicalis superficialis

¹ See Appendix, note 123.

⁴ See Appendix, note 271.

⁷ See Appendix, notes 134, 135, 172, and 203.

⁸ The superior epigastric vessels are known also as the abdominal branches of the internal mammary vessels.

⁹ See Appendix, note 273.

² See Appendix, note 270.

⁵ Often called the femoral lymphatic glands.

¹⁰ See Appendix, note 274.

³ Known also as the external mammary artery and vein.

⁶ See Appendix, note 272.

¹¹ See Appendix, note 127.

FIG. 1068.—THE SUBCUTANEOUS ARTERIES AND VEINS OF THE ANTERIOR WALL OF THE TRUNK.

The Subcutaneous Bloodvessels of the Anterior Wall of the Trunk.

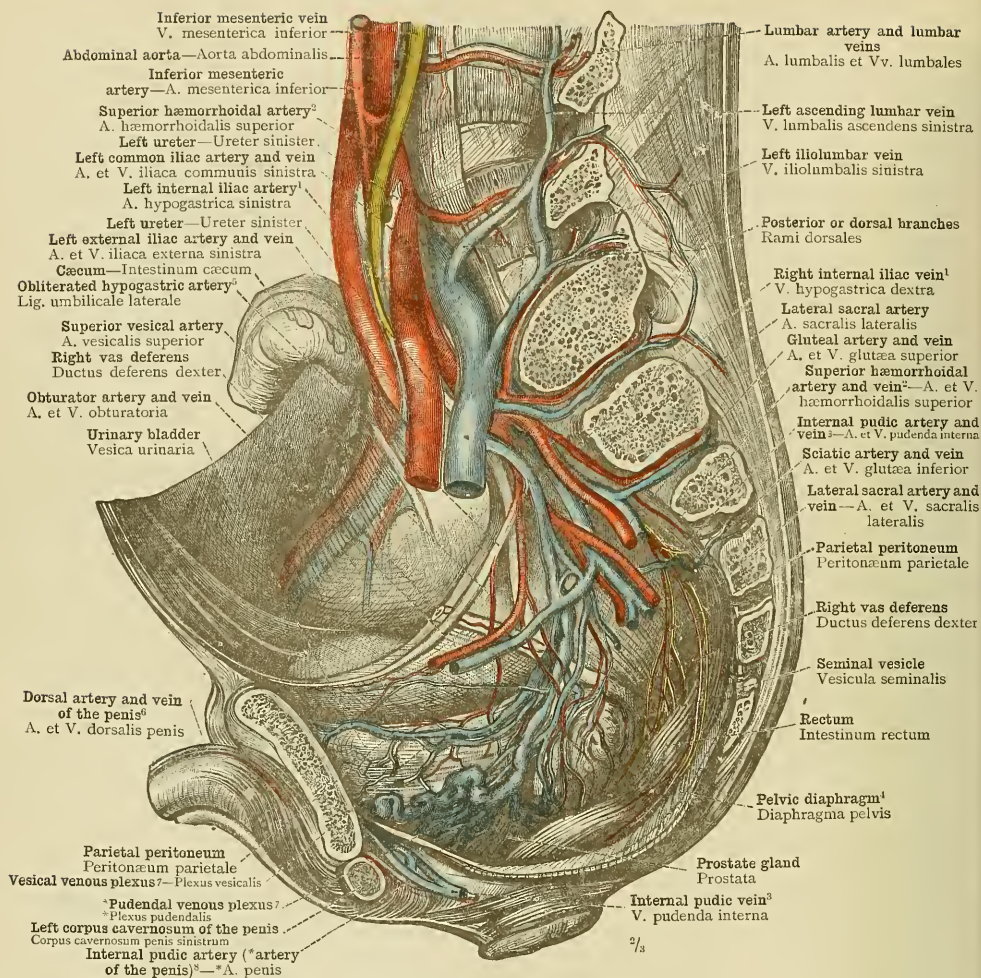


FIG. 1069.—THE VENOUS PLEXUSES OF THE MALE PELVIS; SEEN FROM THE LEFT SIDE.

By a section, which began in front a little to the left of the median plane, and behind passed through the left row of sacral foramina, the left lateral wall of the pelvis was removed, the parietal peritoneum covering this wall being, however, retained up to the level of its reflection on to the urinary bladder and the rectum. The extraperitoneal portions of these organs were exposed, together with the vessels by which they are surrounded; the pelvic diaphragm (see Appendix, note ¹⁴⁰) was cut away close to the rectum and the bladder and drawn slightly downwards. The inferior mesenteric vein has been injected with a yellow material.

The Veins of the Male Pelvis.

¹ See Appendix, note 120.

² Called by Macalister the *superior rectal artery and vein*.
³ Regarding the nomenclature of the *internal pudic artery*, see Appendix, note 139. The same considerations apply to the nomenclature of the companion vein.—Tr.

⁴ See Appendix, note 140.

⁵ See Appendix, note 274.

⁶ Or *external umbilical ligament.

⁷ See Appendix, note 275.

See Appendix, note 143.

⁸ See Appendix, note 142.

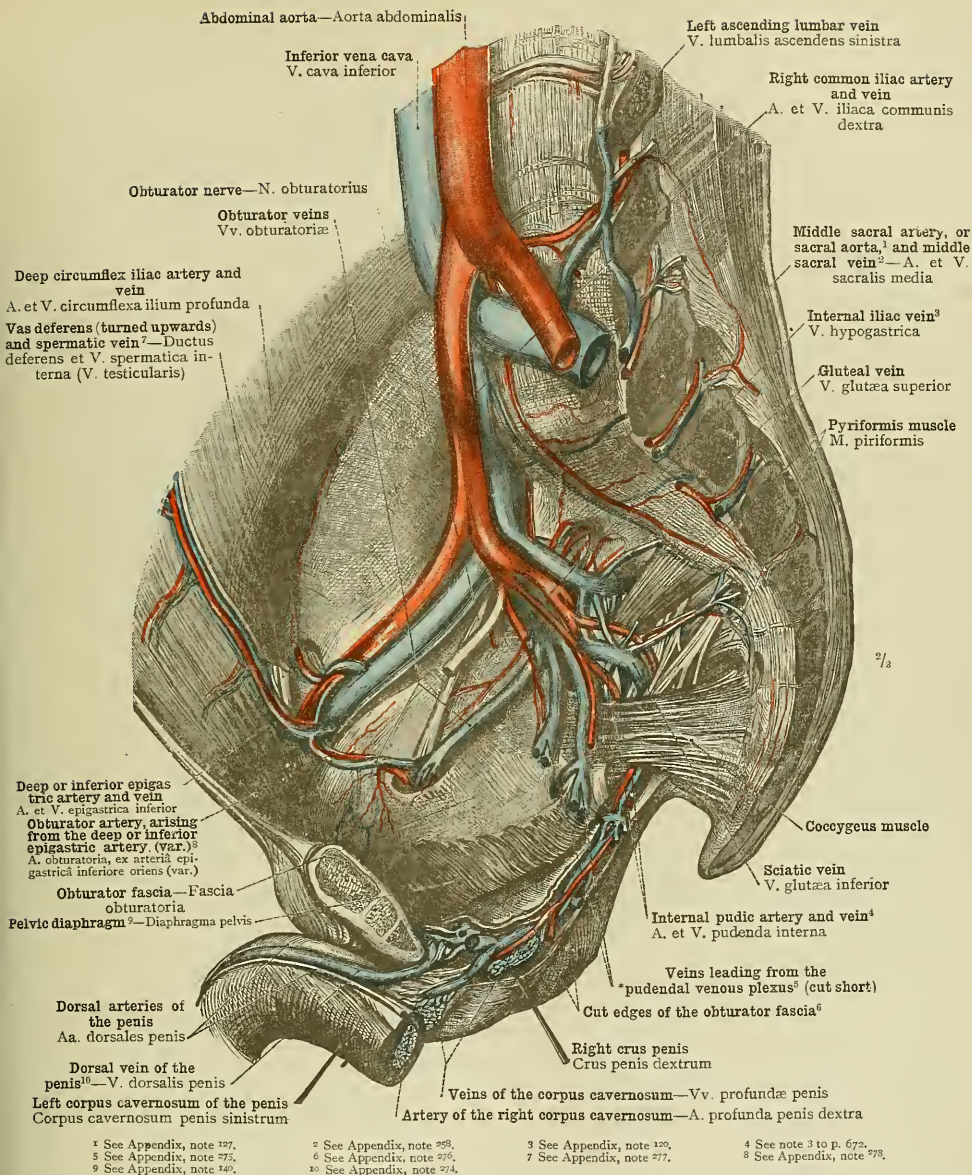


FIG. 1070.—THE VEINS OF THE RIGHT LATERAL WALL OF THE PELVIS AND OF THE MALE EXTERNAL GENITAL ORGANS. SEEN FROM THE LEFT SIDE

The Veins of the Male Pelvis.

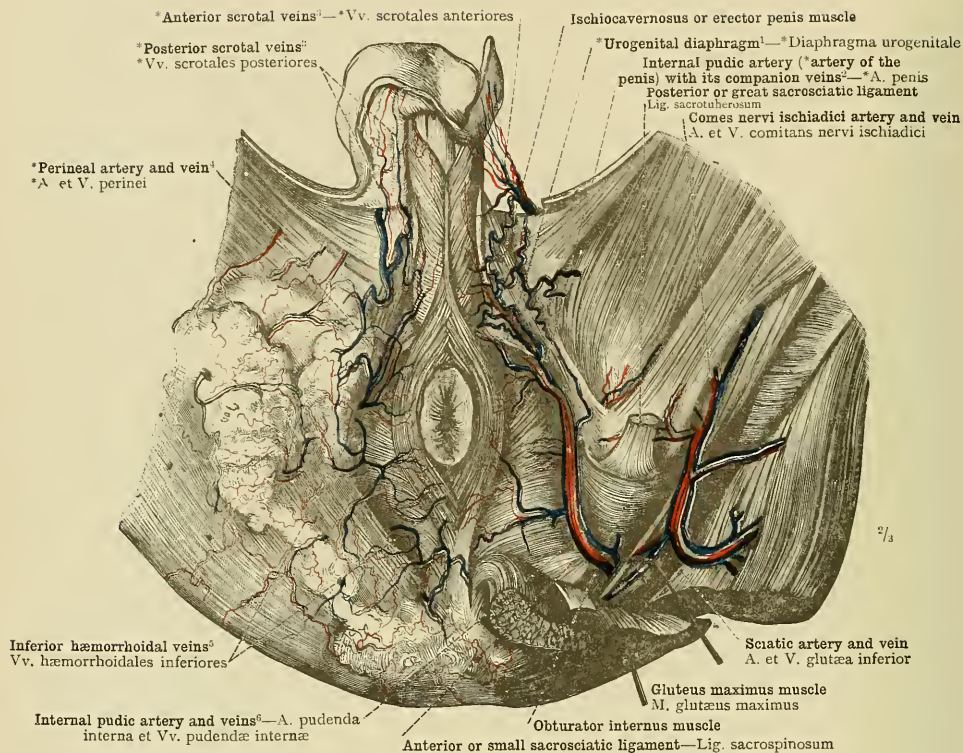
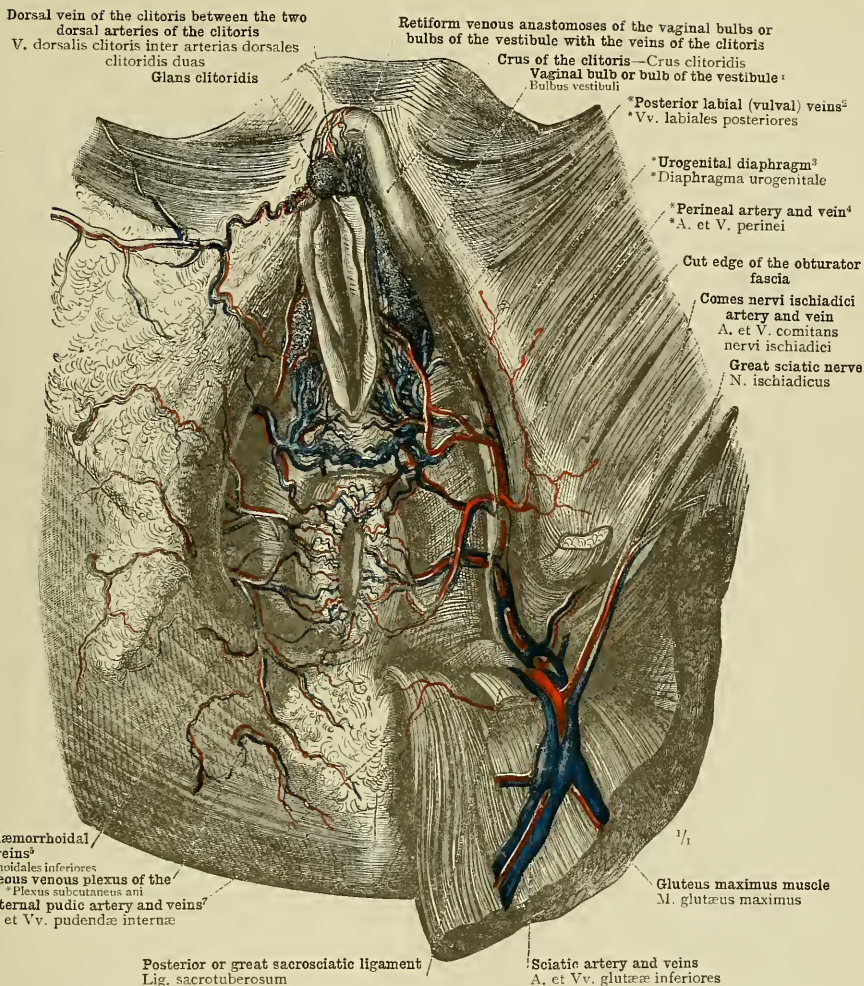
¹ See Appendix, note 147.² See Appendix, note 147.³ See Appendix, note 139.⁴ Regarding the artery called by the author *arteria perinei, see Appendix, notes 147 and 149. The same considerations apply to the nomenclature of the companion vein.—Tr.⁵ The same considerations apply regarding the nomenclature of these veins as regarding that of the artery they accompany. See Appendix, note 139.⁶ See Appendix, note 139.

FIG. 1071.—THE SUPERFICIAL AND DEEP VEINS OF THE MALE PERINEAL REGION.

On the right side of the body the superficial bloodvessels were dissected out and the subcutaneous fat was partially preserved. On the left side of the body the gluteus maximus muscle and the posterior or great sacrosclatic ligament (ligamentum sacrotuberosum) were cut across and the segments were drawn apart, in order to display the passage of the internal pudic artery and veins through the small sacrosclatic foramen (foramen ischiadicum minus); these vessels were also exposed in the outer wall of the ischiorectal fossa. The left testis was removed, in order to lay bare the *anterior scrotal veins and their anastomoses with the *posterior scrotal veins.



¹ See Appendix to Part IV., note 91.
⁵ See note ⁵ to p. 674.

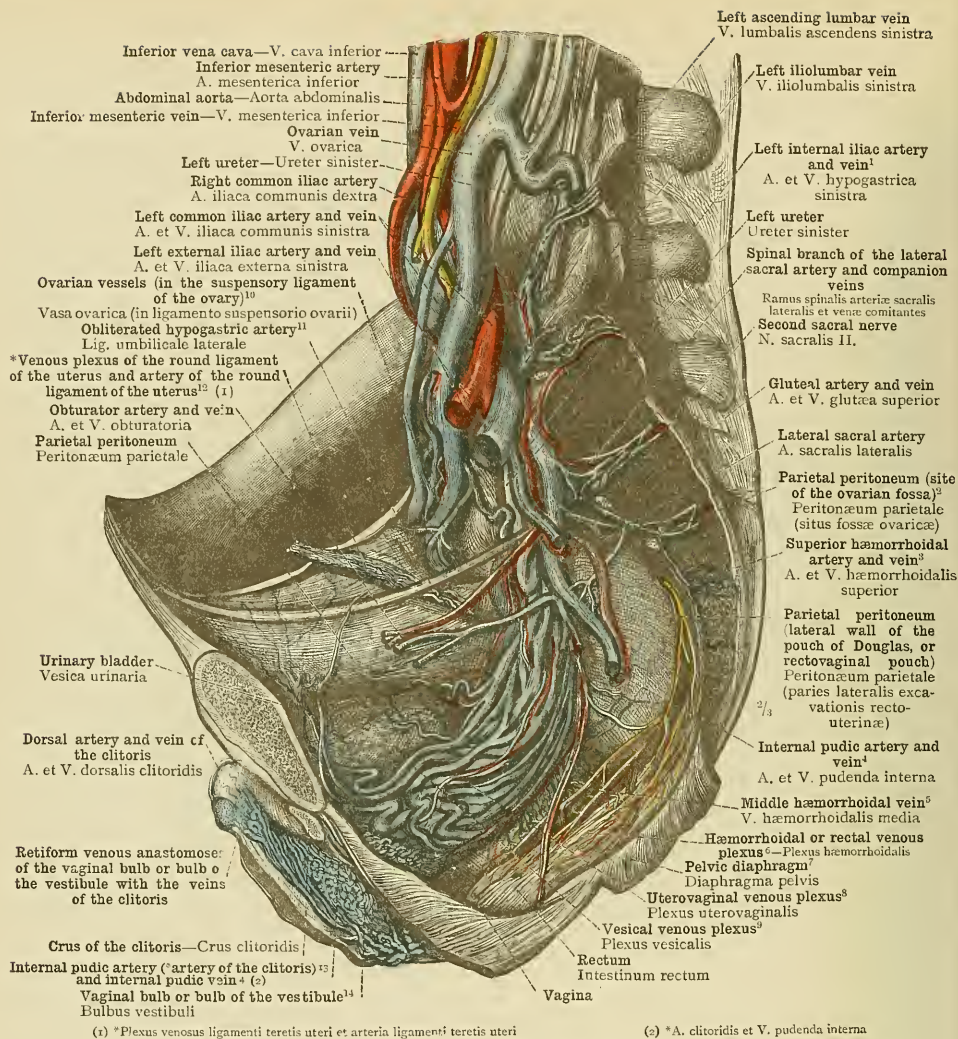
² See Appendix, note 138.
⁶ See Appendix, note 279.

³ See Appendix, note 142.
⁷ See note ³ to p. 672.

⁴ See note 4 to p. 675.

FIG. 1072.—THE SUPERFICIAL AND DEEP VEINS OF THE FEMALE PERINEAL REGION. THE INFERIOR HÆMORRHOIDAL VEINS (see note ⁵ to p. 674), VENÆ HÆMORRHOIDALES INFERIORES; THE *SUBCUTANEOUS VENOUS PLEXUS OF THE ANUS (see Appendix, note 279), *PLEXUS SUBCUTANEUS ANI; THE INTERNAL PUDIC VEINS (see note ³ to p. 672), VENÆ PUDENDÆ INTERNÆ; THE *POSTERIOR LABIAL (OR VULVAL) VEINS (see Appendix, note 138), VENÆ LABIALES POSTERIORES; THE DORSAL VEINS OF THE CLITORIS, VENÆ DORSALES CLITORIDIS, AND THE VAGINAL BULB OR BULB OF THE VESTIBULE (see note ¹ above), BULBUS VESTIBULI.

On the right side of the body, the superficial vessels were dissected out. On the left side of the body, the gluteus maximus muscle and the posterior or great sacrosclatic ligament were cut across and the segments were widely separated; by cutting through the obturator fascia where it covers the internal pudic vessels in the outer wall of the ischioanal fossa, these vessels were exposed in their passage through Alcock's canal (see Appendix, notes 142 and 161). The sphincter vaginæ or bulbocavernosus muscle was removed, together with the anterior extremity of the levator ani muscle, in order to lay bare the vaginal bulbs or bulbs of the vestibule (see note ¹ above) and the transverse anastomoses of the veins that drain the blood away from these structures.



(1) *Plexus venosus ligamenti teretis uteri et arteria ligamenti teretis uteri

(2) *A. clitoridis et V. pudenda interna

¹ See Appendix, note 120.

² A description of the *ovarian fossa* or *fossa ovarii*, (Quain) is given in the Appendix to Part IV., note 79.—Tr.

³ Called by Macalister the *superior rectal artery and vein*.

⁴ Called by Macalister the *middle rectal vein*.

⁵ See Appendix, note 282.

⁶ See Appendix, note 140.

⁷ See Appendix, note 140.

⁸ See Appendix, note 140.

⁹ See Appendix, note 140.

¹⁰ This ligament is known also as the *infundibulopelvic* or *ovariopelvic* fold or ligament.

¹¹ Or *external umbilical ligament*. See Appendix, note 145.

¹² The homologues in the female of the *cremasteric vein and artery*, respectively, in the male.—Tr.

¹³ See Appendix, note 156.

¹⁴ See Appendix to Part IV., note 95.

FIG. 1073.—THE OVARIAN VEIN, VENA OVARICA; THE VESICAL VENOUS PLEXUS (see Appendix, note 275), PLEXUS VESICALIS, AND THE UTEROVAGINAL PLEXUS (see Appendix, note 280), PLEXUS UTEROVAGINALIS; THE *VENOUS PLEXUS OF THE ROUND LIGAMENT OF THE UTERUS (see note 12 above), *PLEXUS VENOSUS LIGAMENTI TEREITIS UTERI. THE SUPERIOR AND MIDDLE HÆMORRHOIDAL (OR RECTAL) VEINS, VENE HÆMORRHOIDALES SUPERIOR ET MEDIA; HÆMORRHOIDAL VENOUS PLEXUS, PLEXUS HÆMORRHOIDALIS. THE VENOUS PLEXUSES THAT SURROUND THE SPINAL BRANCHES OF THE ILIOLUMBAR AND LATERAL SACRAL ARTERIES.

By a section, which in front passed near the median plane, and behind through the left row of sacral foramina, the left lateral wall of the pelvis was removed; but the parietal peritoneal investment of this wall was preserved up to its reflection on to the urinary bladder, the vagina, and the rectum. The parts of these organs situate outside the peritoneum were laid bare in so far as this was possible without removing the adjacent venous plexuses. The pelvic diaphragm was turned downwards.

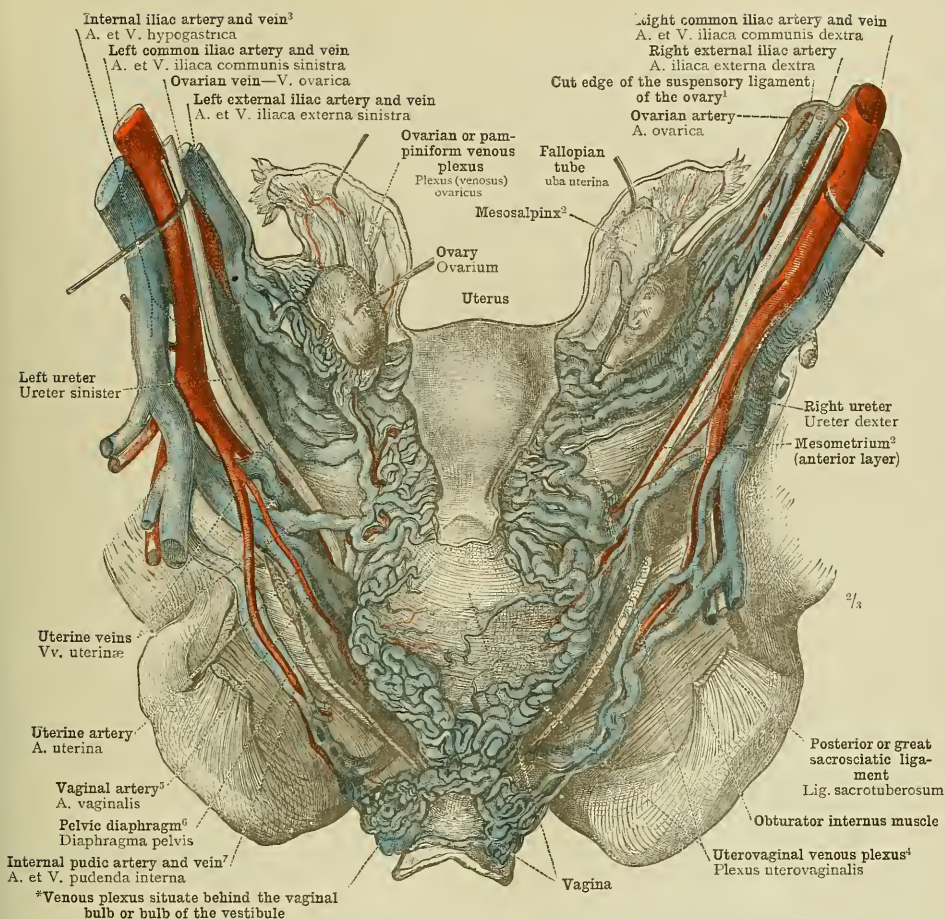
¹ Known also as the *infundibulopelvic* or *ovariopelvic* fold or ligament.³ See Appendix, note 120.⁴ See Appendix, note 282.⁵ See Appendix, note 263.² See Appendix to Part IV., note 82.⁶ See Appendix, note 140.⁷ See note 3 to p. 672

FIG. 1074.—THE VEINS OF THE UTERUS, THE VAGINA, THE OVARIES, AND THE FALLOPIAN TUBES, SEEN FROM BEHIND: THE OVARIAN VEIN, VENA OVARICA, CONTINUED INTO THE OVARIAN OR PAMPINIFORM VENOUS PLEXUS, PLEXUS VENOSUS OVARICUS, AND HAVING FREE CONNEXIONS WITH THE UTERINE VEINS, VENÆ UTERINÆ, AND THE UTEROVAGINAL VENOUS PLEXUS (see Appendix, note 281), PLEXUS UTEROVAGINALIS. THE INTERNAL PUDIC VEIN, AND ITS CONNEXIONS WITH THE VENOUS PLEXUS SITUATE BEHIND THE VAGINAL BULB OR BULB OF THE VESTIBULE.

The posterior half of the pelvis, together with the rectum and the posterior layer of the mesometrium, having been removed by a coronal section passing just behind the spine of the ischium, the uterovaginal plexus, with the veins leading from it, was laid bare. The ovaries were drawn well upwards, in order to spread out their mesentery; the left ovary was also drawn somewhat inwards, so as to display, after the outer layer of the mesovarium had been removed, the ovarian or pampiniform venous plexus, plexus (venosus) ovaricus. The common iliac vessels and the ureters were drawn outwards on each side. The internal pudic vessels were fully exposed by the removal of the obturator fascia where it covers them as they pass along the outer wall of the ischio-rectal fossa.

The Veins of the Female Pelvis.

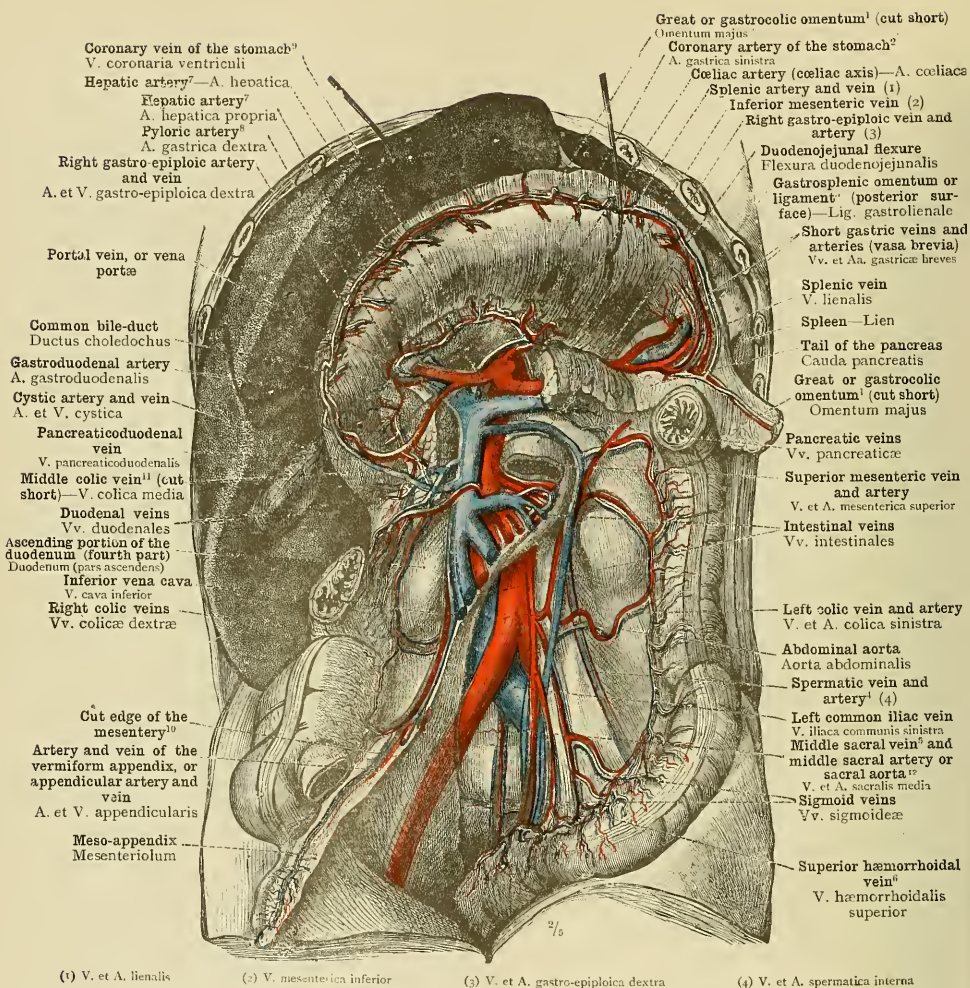
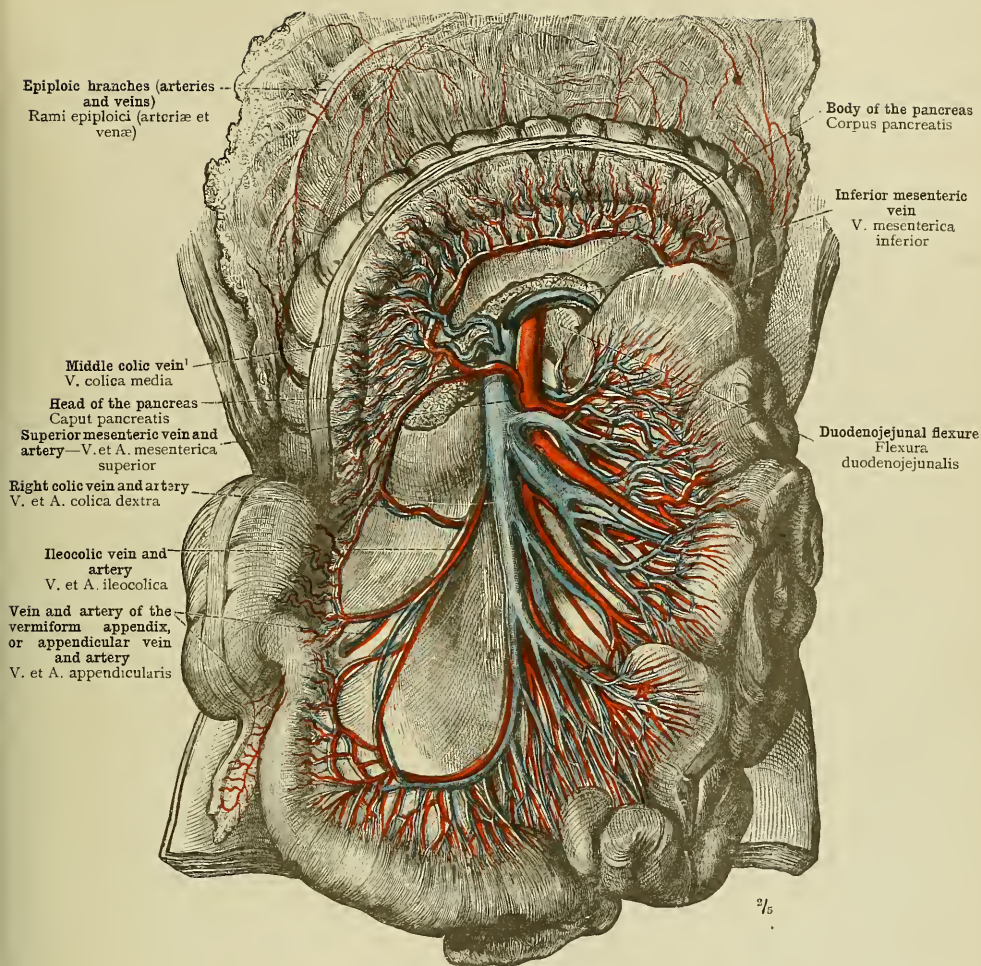
¹ Or *epiploea*.² Called by Macalister the *gastric artery*.³ The *gastrosplenic omentum* is connected below with the *great omentum*, and is often regarded as a part of it.—Tr.⁴ See Appendix, note 277.⁵ See Appendix, note 278.⁶ Called by Macalister the *superior rectal vein*.⁷ See Appendix, note 130.⁸ Called by Macalister the *superior pyloric artery*. See Appendix, note 131.⁹ Called by Macalister the *gastric vein*.¹⁰ *I.e.*, the *mesentery of the jejunum and ileum*, which is always denoted in England by the term *mesentery* when used without qualification.—Tr.¹¹ Called by Macalister the *transverse colic vein*.¹² See Appendix, note 127.

FIG. 1075.—FORMATION OF THE PORTAL VEIN OR VENA PORTÆ BY THE CONFLUENCE OF THE SUPERIOR AND INFERIOR MESENTERIC VEINS, VENA MESENTERICA SUPERIOR ET INFERIOR, THE SPLENIC VEIN, VENA LIENALIS, AND THE CORONARY VEIN OF THE STOMACH OR GASTRIC VEIN, VENA CORONARIA VENTRICULI.

The great or gastrocolic omentum (or epiploon) was cut away immediately below the great curvature of the stomach, and the stomach itself was turned upwards. The jejunum and the ileum, as well as the transverse colon and the upper half of the ascending colon, were cut away, and the mesentery (see note ¹⁰ above) was cut away close to its root. The cecum was drawn outwards, in order to stretch the meso-appendix and to display the artery and vein of the vermiform appendix (appendicular artery and vein—arteria et vena appendicularis) between its layers. By the partial removal of the pancreas, the confluence of the superior mesenteric vein, vena mesenterica superior, and the splenic vein, vena lienalis, was displayed. The abdominal aorta, the inferior vena cava, the middle sacral artery or sacral aorta, and the middle sacral vein, were exposed by the removal of the parietal peritoneum covering these vessels.

The Portal System of Veins.



¹ Called by Macalister the *transverse colic vein*.

FIG. 1076.—THE TRIBUTARIES OF THE SUPERIOR MESENTERIC VEIN, VENA MESENTERICA SUPERIOR, AND THE TERMINAL PORTION OF THE INFERIOR MESENTERIC VEIN, VENA MESENTERICA INFERIOR. SEEN FROM BEFORE.

The jejunum (intestinum jejunum) and the ileum (intestinum ileum), with the mesentery (see note ¹⁰ to p. 678), were drawn to the left; the colon and the transverse mesocolon (mesocolon transversum), with the adjoining portion of the great or gastrocolic omentum (or epiploön), were drawn upwards.

V. mesenterica superior—The superior mesenteric vein.

VENÆ COLLI ET CAPITIS

THE VEINS OF THE HEAD AND
NECK

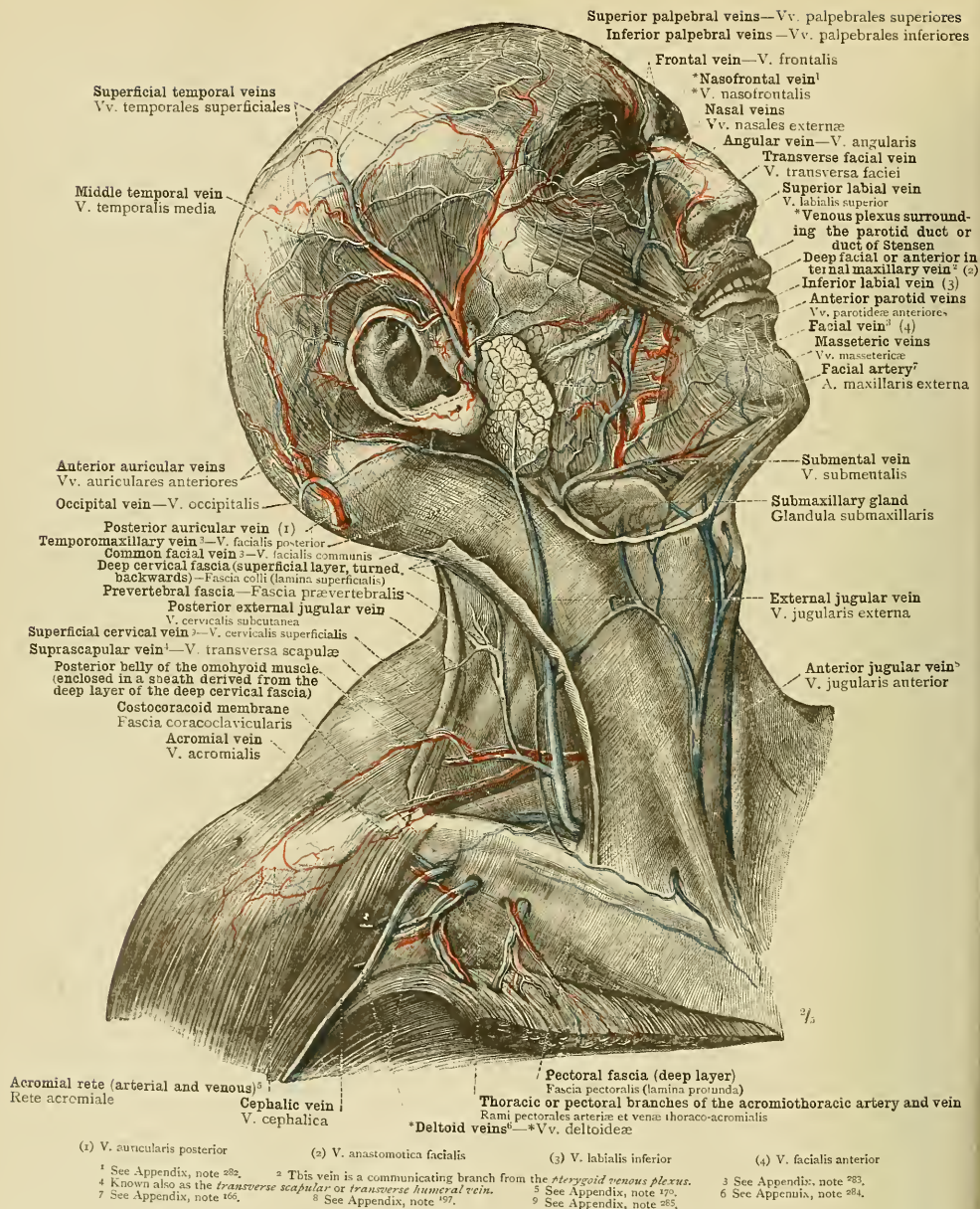
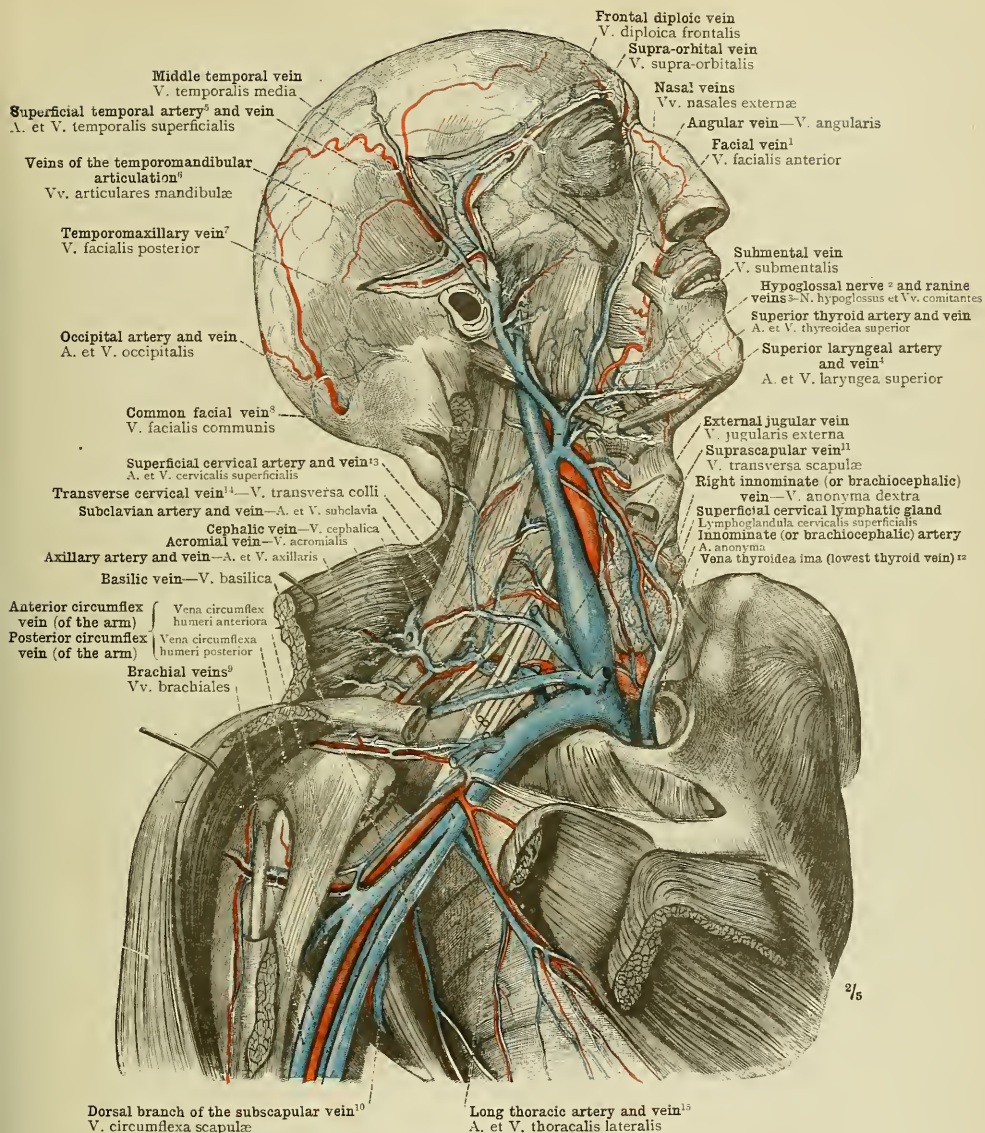


FIG. 1077.—THE SUPERFICIAL VEINS OF THE HEAD AND NECK: THE ORIGIN OF THE FACIAL (OR ANTERIOR FACIAL) VEIN, VENA FACIALIS ANTERIOR, AND THE TEMPOROMAXILLARY (OR POSTERIOR FACIAL) VEIN, VENA FACIALIS POSTERIOR (see Appendix, note 283); THE OCCIPITAL VEIN, VENA OCCIPITALIS; THE ANTERIOR AND EXTERNAL JUGULAR VEINS, VENÆ JUGULARES ANTERIOR ET EXTERNA; THE POSTERIOR EXTERNAL JUGULAR VEIN, VENA CERVICALIS SUBCUTANEA.



2/5

¹ Sometimes distinguished as the *anterior facial vein*. See Appendix, note 283.² *Twelfth cranial nerve* in Soemmerring's enumeration, *ninth* in that of Willis; sometimes also known as the *lingual motor nerve*.³ See Appendix, note 286.⁴ Or *laryngeal branches of the superior thyroid artery and vein*, respectively.⁵ See Appendix, note 287.⁶ Or *venae comites of the brachial artery*. See Appendix, note 283.⁷ See Appendix, note 283.⁸ Known also as the *transverse scapular or transverse humeral vein*. See note 1 to p. 590.⁹ See Appendix, note 285.¹⁰ Often called the *dorsal scapular vein*.¹¹ Companion to the *thyroidea ima artery*. See note 1 to p. 590.¹² Known also as the *external mammary artery and vein*.¹³ See Appendix, note 285.¹⁴ See Appendix, note 285.¹⁵ Known also as the *external mammary artery and vein*.FIG. 1078.—THE FACIAL VEIN (see note ¹ above), VENA FACIALIS ANTERIOR; THE FORMATION OF THE TEMPOROMAXILLARY VEIN (see note ⁷ above), VENA FACIALIS POSTERIOR; THE INTERNAL JUGULAR VEIN, VENA JUGULARIS INTERNA; THE AXILLARY VEIN, VENA AXILLARIS. SEEN FROM THE RIGHT SIDE AND BEFORE.

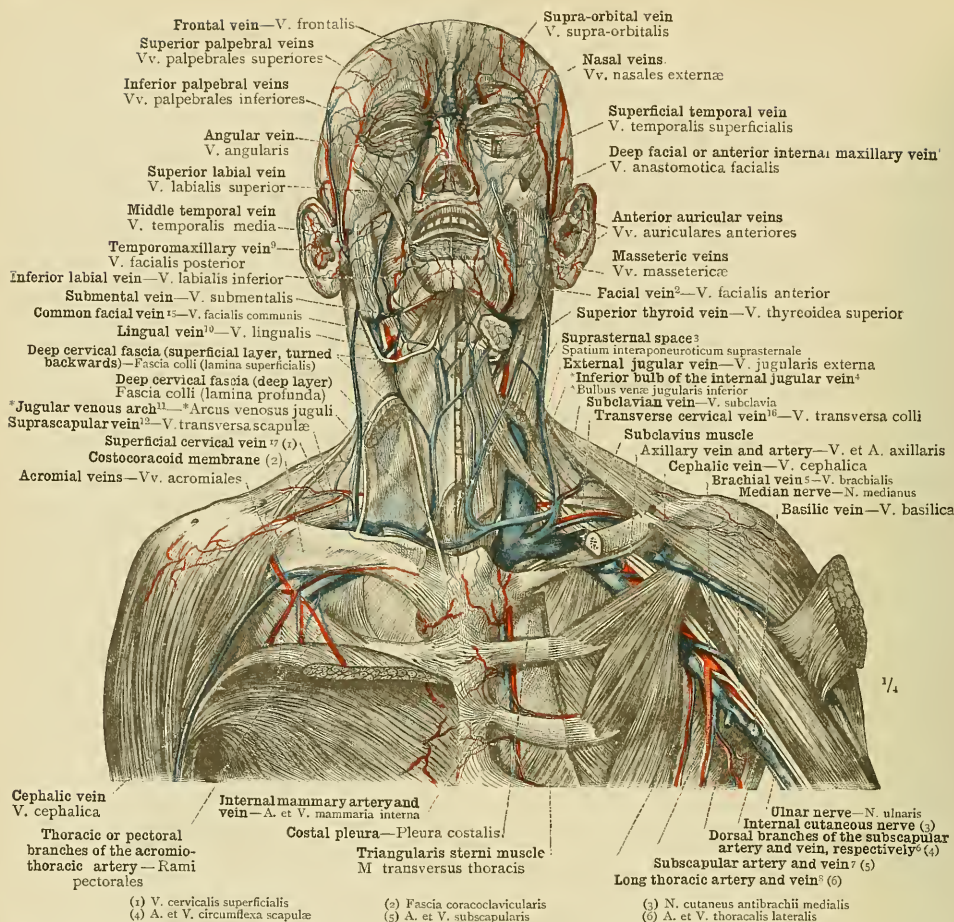


FIG. 1079.—THE SUPERFICIAL VEINS OF THE FACE, THE SUPERFICIAL AND DEEP VEINS OF THE NECK, AND THE VEINS OF THE AXILLA; SEEN FROM BEFORE.

On the right side of the neck, by the removal of the superficial layer of the deep cervical fascia, the *submaxillary fossa (*fossa submaxillaris—see note 13 below), the *greater suprascapular fossa (fossa suprascapularis major—see note 14 below), and the suprasternal space (spatium interaponeuroticum suprasternale—see note 3 below), were opened. The lower half of the sternocleidomastoid muscle was removed, together with the corresponding portion of the superficial layer of the deep cervical fascia, in order to lay bare the opening of the *jugular venous arch (see Appendix, note 123) into the terminal portion of the external jugular vein. On the left side of the neck the ensheathing portion of the deep cervical fascia was entirely removed, and the lower half of the sternocleidomastoid muscle was removed, together with the sternal extremity of the clavicle, in order to display the deep venous trunks and the left *venous angle (*angulus venosus—see Appendix, note 125). On the right side of the body, the clavicular portion of the pectoralis major muscle has been turned downwards, thus exposing the axillary vein above the pectoralis minor muscle. On the left side of the body, the pectoralis major muscle having been removed, the vessels and nerves of the axilla were dissected out. Further, on this side, by the partial removal of the anterior or external intercostal aponeuroses and of the internal intercostal muscles, the internal mammary vessels were exposed, and their relation to the costal pleura and to the triangularis sterni muscle was displayed.

¹ See note 2 to p. 682.

² Sometimes distinguished as the *anterior facial vein*. See Appendix, note 283.

³ Called by Macalister *Burns's space*. See Appendix, note 123.

⁴ Known also as the *dorsalis scapulae artery and vein*, respectively.

⁵ Known also as the *external maxillary artery and vein*.

⁶ Or *vena comitis of the lingual artery*. See Appendix, note 286.

⁷ Known also as the *transverse scapular or transverse humeral vein*.

⁸ See Appendix, note 283.

⁹ Sometimes called the *posterior facial vein*.

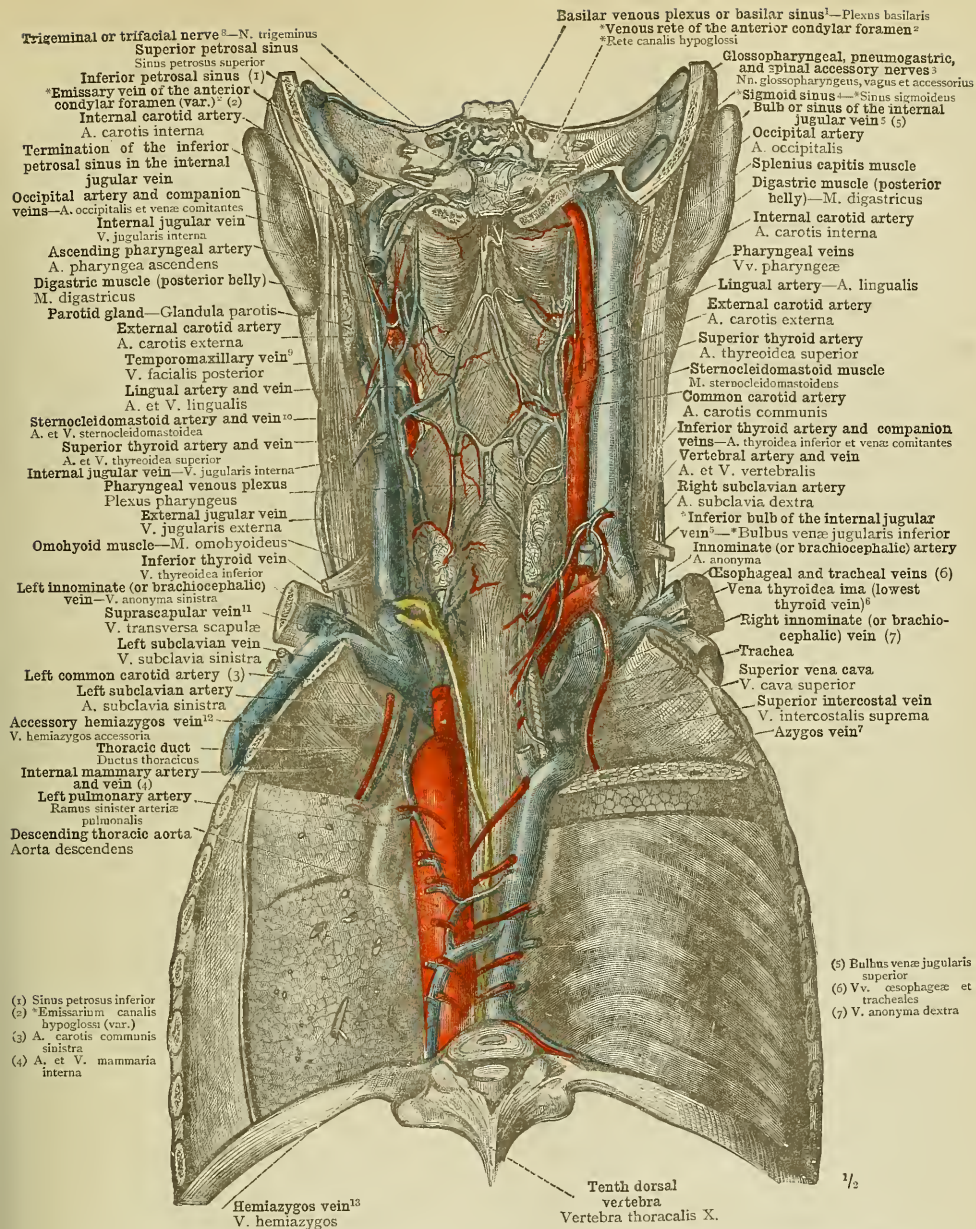
¹⁰ See Appendix, note 282.

¹¹ See Appendix, note 283.

¹² See Appendix, note 285.

¹³ See Appendix, note 285.

¹⁴ See Appendix, note 285.



- (5) Bulbus vena jugularis superior
 (6) Vv. esophagae et tracheales
 (7) V. anonyma dextra

1/2

¹ See Appendix, note 220. ² See Appendix, note 224.
³ Or ninth, tenth, and eleventh cranial nerves in Soemmering's enumeration; together forming the eighth cranial nerve in Willis's enumeration.
⁴ The "sigmoid sinus" is the proximal portion of the lateral sinus as described by most English anatomists. See Appendix, note 254.
⁵ See Appendix, note 11. ⁶ Companion to the thyroidea ima artery. See note ⁴ to p. 590.
⁷ Known also as the right or large azygos vein. ⁸ Or fifth cranial nerve.
⁹ Sometimes called the posterior facial vein. See Appendix, note 208. ¹⁰ See Appendix, note 160.
¹¹ Known also as the transverse scapular or transverse humeral vein. ¹² Known also as the left upper azygos vein.
¹³ Known also as the left lower or small azygos vein.

FIG. 1080.—THE VEINS OF THE PHARYNX, THE ESOPHAGUS, AND THE TRACHEA; THE BASILAR VENOUS PLEXUS OR BASILAR SINUS (see Appendix, note 220), PLEXUS BASILARIS; THE AZYGOS, HEMIAZYGOS, AND ACCESSORY HEMIAZYGOS VEINS (see notes ¹, ¹², and ¹³ above); THE THORACIC DUCT, DUCTUS THORACICUS. SEEN FROM BEHIND.

The Pharyngeal and Basilar Venous Plexuses.—The Azygos Veins.

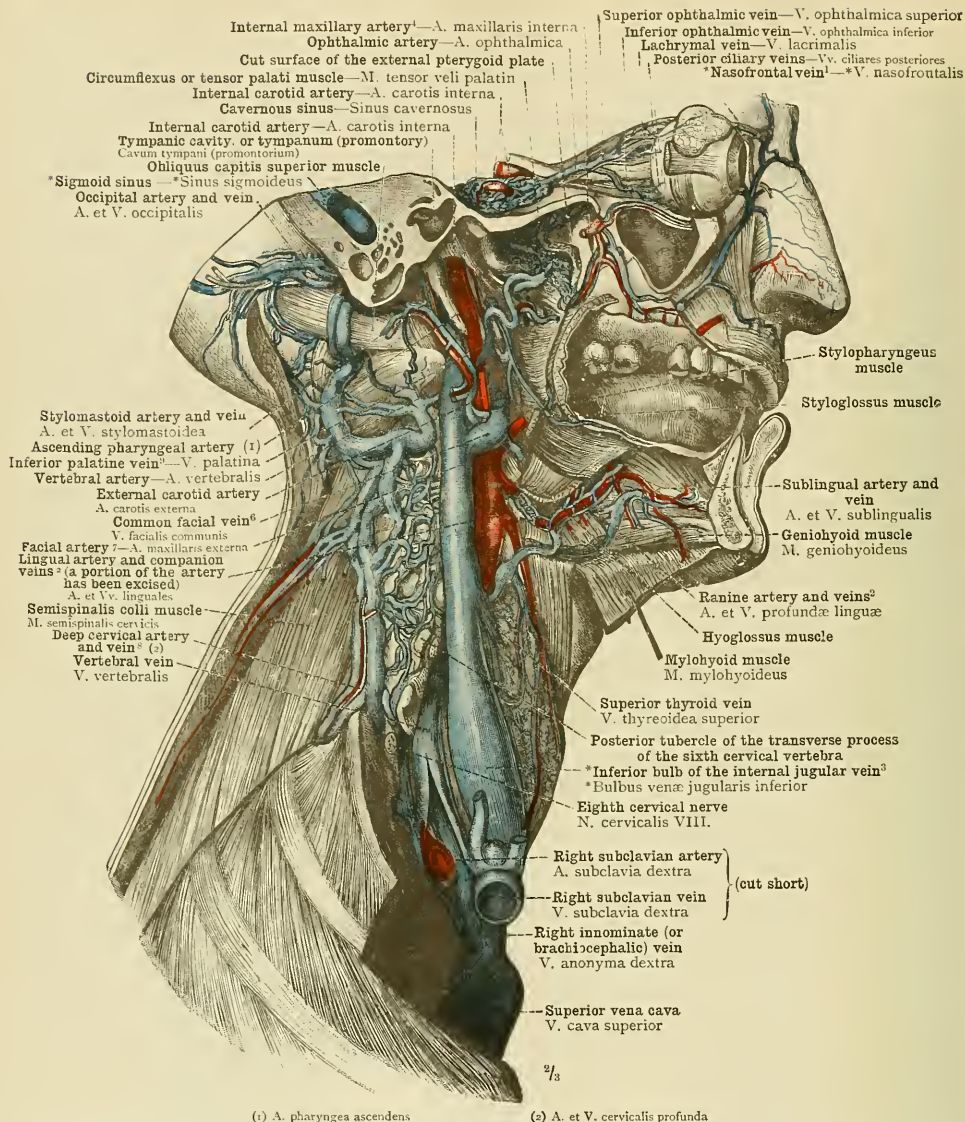
¹ See Appendix, note ²⁶⁵.² See Appendix, note ²⁶⁶.³ See Appendix, note ²²⁷.⁴ See Appendix, note ¹⁶⁶.⁵ The *sigmoid sinus is the proximal portion of the *internal sinus* as described by most English anatomists. See Appendix, note ²⁶⁴.⁶ See Appendix, note ²⁷³.⁷ See Appendix, note ¹⁶⁶.⁸ The *deep cervical vein* is known also as the *posterior vertebral vein*.⁹ See note 7 to p. 689.

FIG. 1081.—THE CAVERNOUS SINUS AND THE VEINS OF THE ORBIT; THE DEEP VISCERAL VEINS OF THE HEAD AND NECK; THE DEEP CERVICAL OR POSTERIOR VERTEBRAL VEIN, VENA CERVICALIS PROFUNDA, AND THE VERTEBRAL VEIN, VENA VERTEBRALIS. SEEN FROM THE RIGHT SIDE.

The Deep Veins of the Head and Neck.

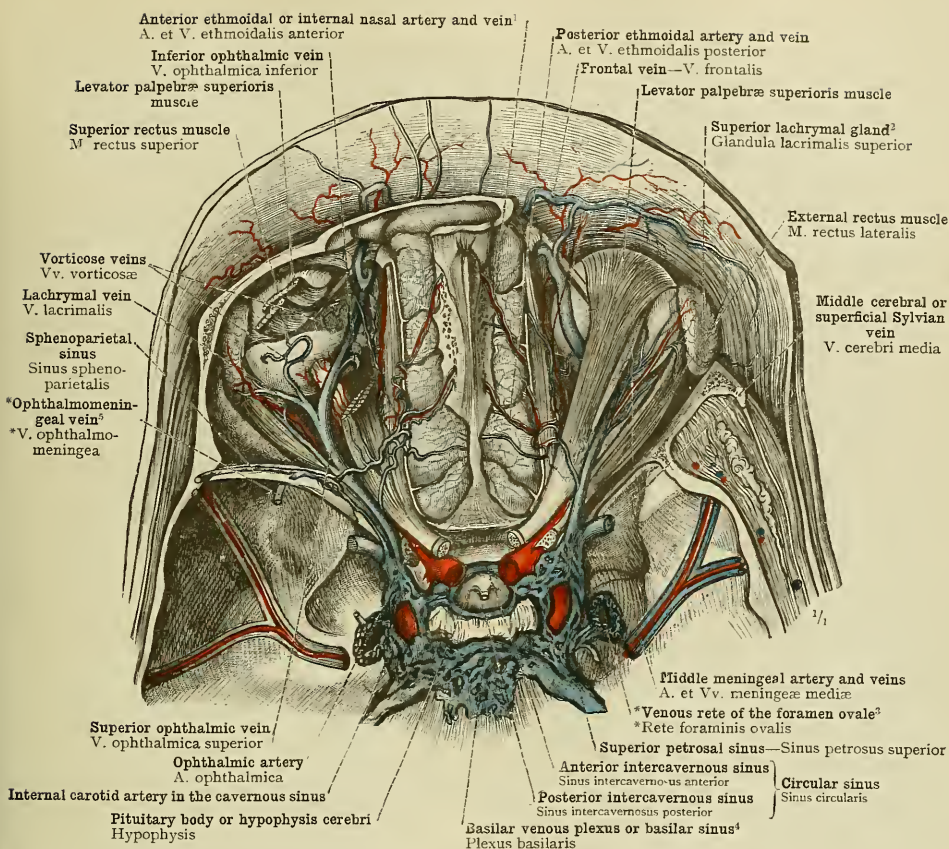
¹ See Appendix, note 184.² See Appendix, note 179.³ See Appendix, note 202.⁴ Sometimes also known as the *transverse sinus*. See Appendix, note 200.⁵ A communicating branch between the *superior ophthalmic vein* and the *middle cerebral or superficial Sylvian vein*, which in this specimen, however, opens posteriorly into the *sphenoparietal sinus*.

FIG. 1082.—THE VEINS OF THE ORBIT, SEEN FROM ABOVE: THE SUPERIOR OPHTHALMIC VEIN, VENA OPHTHALMICA SUPERIOR, ITS CONFLUENCE WITH THE INFERIOR OPHTHALMIC VEIN, VENA OPHTHALMICA INFERIOR, AND ITS TERMINATION IN THE CAVERNOUS SINUS, SINUS CAVERNOSUS; THE LACHRYMAL VEIN, VENA LACRIMALIS; THE VORTICOSE VEINS, VENÆ VORTICOSÆ; MUSCULAR VEINS, VENÆ MUSCULARES; THE *OPHTHALMOMENINGEAL VEIN, *VENA OPHTHALMOMENINGEA, OPENING POSTERIORLY, IN THIS SPECIMEN, INTO THE SPHENOPARIETAL SINUS, SINUS SPHENOPARIETALIS. THE CAVERNOUS SINUS, SINUS CAVERNOSUS, AND THE ANTERIOR AND POSTERIOR INTERCAVERNOUS SINUSES, SINUS CAVERNOSI ANTERIOR ET POSTERIOR, THE RIGHT AND LEFT CAVERNOUS SINUSES AND THE ANTERIOR AND POSTERIOR INTERCAVERNOUS SINUSES, COMBINING TO MAKE UP THE CIRCULAR SINUS, SINUS CIRCULARIS. THE BASILAR VENOUS PLEXUS OR BASILAR SINUS (see note ⁴ above), PLEXUS BASILARIS. THE MIDDLE MENINGEAL ARTERY AND VEINS, ARTERIA ET VENÆ MENINGEÆ MEDIE.

The left orbit was opened, by the removal of its roof, the right by the removal of its roof and the greater part of its outer wall. On the right side, the muscles of the orbit were left intact; on the left side, the levator palpebræ superioris and superior rectus muscle were partly removed, in order to lay bare the superior ophthalmic vein throughout its whole course. On the left side, in the dura mater covering the inferior surface of the small wing of the sphenoid bone (this wing having first been removed), the sphenoparietal sinus was exposed, and was traced to its termination in the cavernous sinus.

The Veins of the Orbit.—The Cavernous and Circular Sinuses.

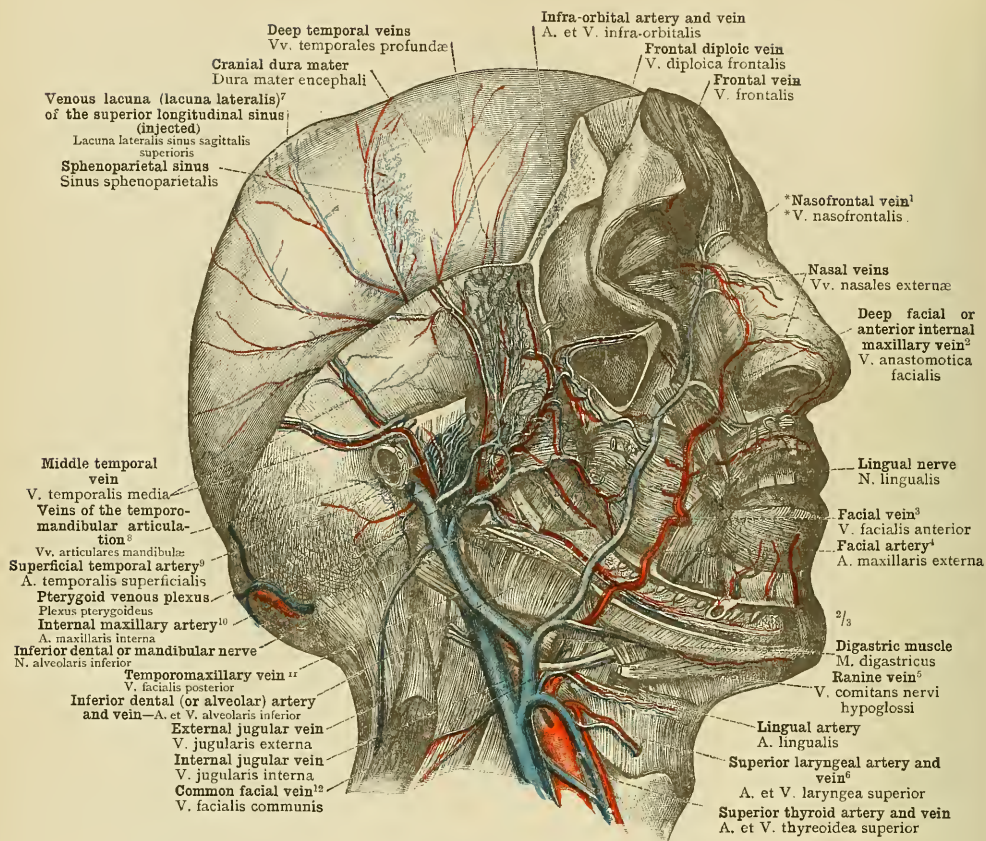
¹ See Appendix, note 282.² This vein is a communicating branch from the pterygoid venous plexus.³ Sometimes distinguished as the anterior facial vein. See Appendix, note 283.⁴ See Appendix, note 166.⁵ See Appendix, note 286.⁶ Or laryngeal branch of the superior thyroid artery and vein, respectively.⁷ See Appendix, note 293.⁸ See Appendix, note 287.⁹ See Appendix, note 166.¹⁰ Sometimes called the posterior facial vein. See Appendix, note 283.¹¹ See Appendix, note 283.

FIG. 1083.—THE FORMATION OF THE COMMON FACIAL VEIN, VENA FACIALIS COMMUNIS, BY THE CONFLUENCE OF THE FACIAL (OR ANTERIOR FACIAL) VEIN, VENA FACIALIS ANTERIOR, AND THE TEMPOROMAXILLARY (OR POSTERIOR FACIAL) VEIN, VENA FACIALIS POSTERIOR (see Appendix, note 283). THE PTERYGOID VENOUS PLEXUS, PLEXUS PTERYGOIDEUS, THE VEINS OF THE LOWER JAW, AND THE VEINS OF THE DURA MATER—THE MIDDLE MENINGEAL VEINS, VENÆ MENINGEÆ MEDIÆ. SEEN FROM THE RIGHT SIDE.

By the partial removal of the skull-cap (calvaria), the cranial dura mater was exposed. By the removal of the zygomatic arch, of the upper half of the ramus of the mandible (with the exception of the head of the condyle), and of the temporal and masseter muscles, the pterygoid venous plexus, plexus pterygoideus, was exposed. By the opening of the mandibular or inferior dental canal, canalis mandibulae, the inferior dental (or alveolar) artery and its plexiform companion veins were exposed.

The Pterygoid Venous Plexus, Plexus Pterygoideus.—The Veins of the Dura Mater and of the Lower Jaw.

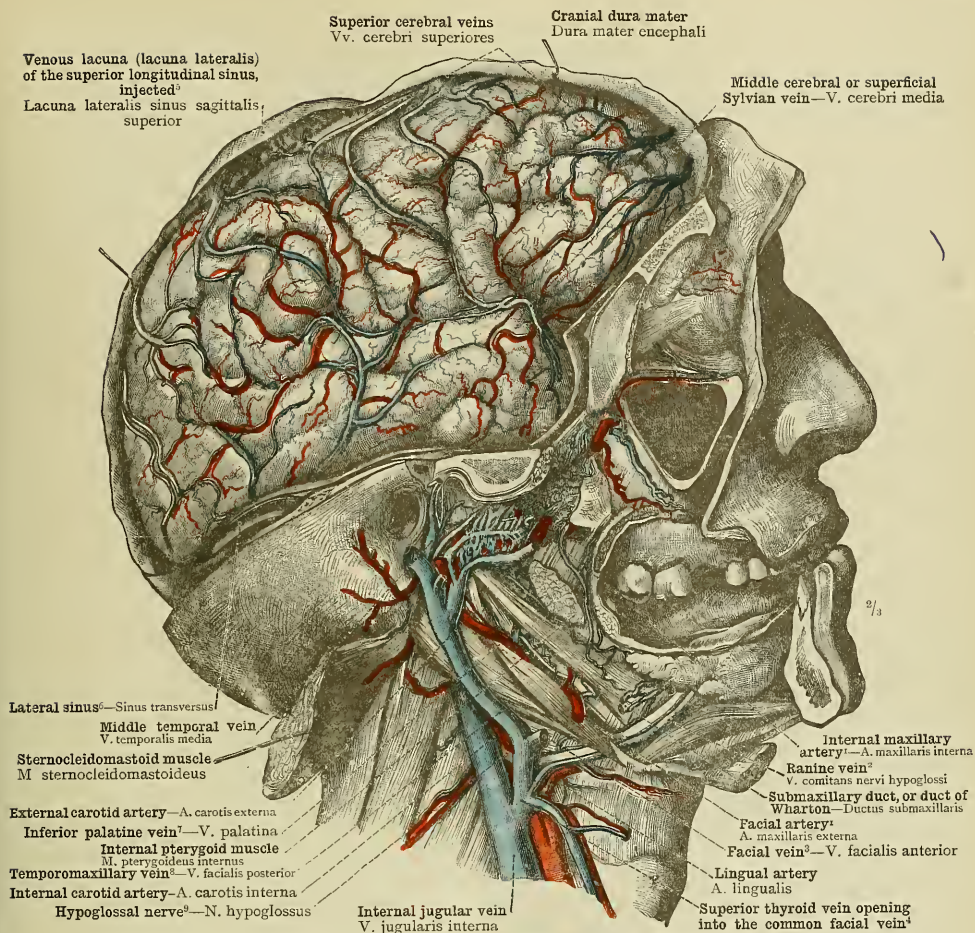
¹ See Appendix, note 166.² See Appendix, note 286.³ Sometimes distinguished as the *anterior facial vein*.⁴ See Appendix, note 293.⁵ See Appendix, note 294.⁶ See Appendix, note 293.⁷ See Appendix, note 295.⁸ Sometimes called the *posterior facial vein*.⁹ See Appendix, note 283.¹⁰ Or *twelfth cranial nerve*, in Soemmerring's enumeration; *ninth cranial nerve*, in that of Willis.¹¹ Sometimes also called the *lingual motor nerve*.

FIG. 1084.—THE VEINS OF THE CONVEXITY OF THE CEREBRAL HEMISPHERES, SUPERIOR CEREBRAL VEINS, VENÆ CEREBRI SUPERIORES, AND THEIR TERMINATION IN THE SUPERIOR LONGITUDINAL SINUS; THE MIDDLE CEREBRAL OR SUPERFICIAL SYLVIAN VEIN, VENA CEREBRI MEDIA. IN THIS SPECIMEN, THE INTERNAL MAXILLARY ARTERY RUNS ON THE OUTER INSTEAD OF ON THE INNER SURFACE OF THE EXTERNAL PTERYGOID MUSCLE, SURROUNDED BY THE DEEPER PORTION OF THE PTERYGOID VENOUS PLEXUS, PLEXUS PTERYGODEUS, AND THIS LATTER, ON ACCOUNT OF THE ABNORMAL COURSE OF THE ARTERY, IS MORE LARGELY DEVELOPED THAN USUAL. SEEN FROM THE RIGHT SIDE.

The skull-cap (calvaria) and the cranial dura mater having been completely removed, the veins on the convexity of the right cerebral hemisphere were exposed, and were traced to their termination in the venous lacunae (lacunae laterales) of the superior longitudinal sinus (see Appendix, note 293). The right half of the mandible was removed, the inter-articular disc being, however, left behind. A portion of the upper head only of the external pterygoid muscle was preserved, as also was the cranial extremity of the internal pterygoid muscle.

The Pterygoid Venous Plexus, Plexus Pterygoideus.—The Veins of the Brain.

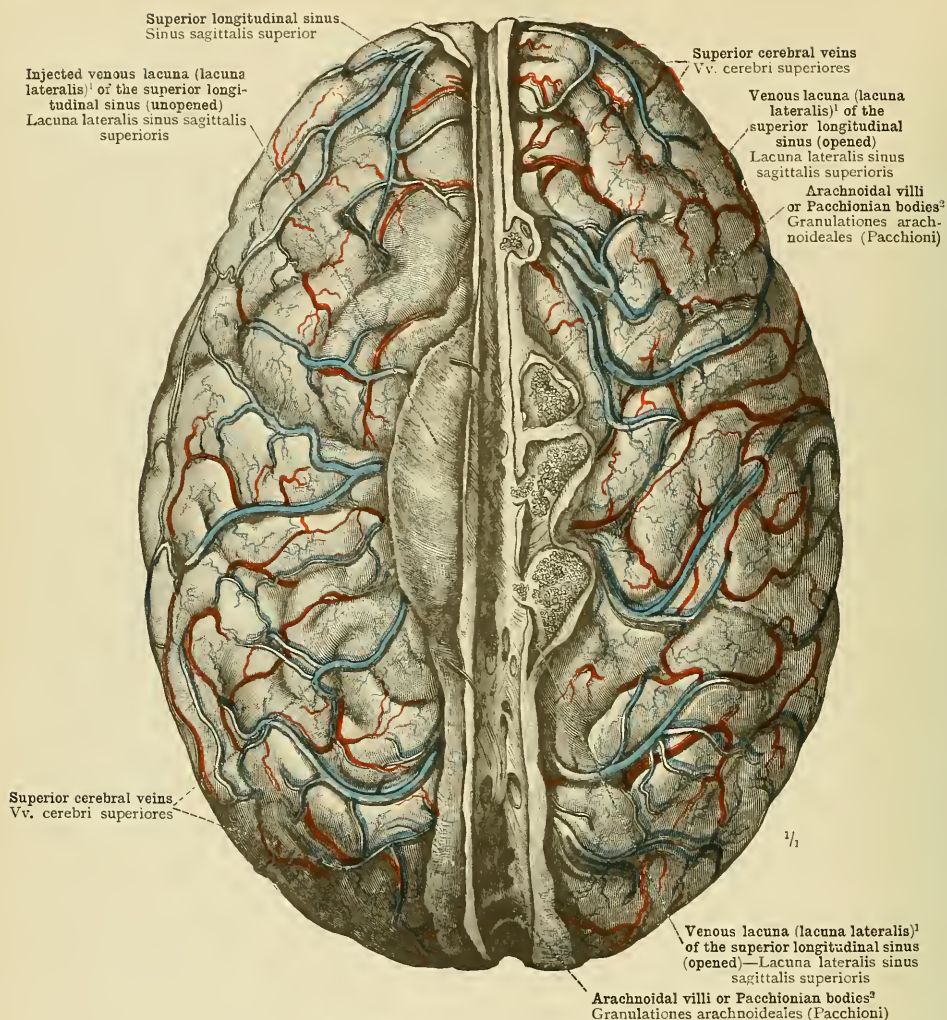
¹ See Appendix, note 292.² See Appendix, note 295.

FIG. 1085.—THE SUPERIOR CEREBRAL VEINS, VV. CEREBRI SUPERIORES. THE SUPERIOR LONGITUDINAL SINUS, SINUS SAGITTALIS SUPERIOR; ITS VENOUS LACUNÆ (LACUNÆ LATERALES—see Appendix, note 293), AND THE RELATIONS OF THE LATTER TO THE SUPERIOR CEREBRAL VEINS AND TO THE ARACHNOIDAL VILLI OR PACCHIONIAN BODIES (GRANULATIONES ARACHNOIDEALES PACCHIONI—see Appendix, note 296). SEEN FROM ABOVE.

The cranial dura mater was removed, except in the immediate vicinity of the superior longitudinal sinus (sinus sagittalis superior), which was opened. On the left side the injected venous lacunæ (lacunæ laterales) of this sinus are seen unopened; on the right side these lacunæ were opened from above, and the arachnoid villi or Pacchionian bodies proliferating in their interior were thus displayed.

Veins of the Brain.

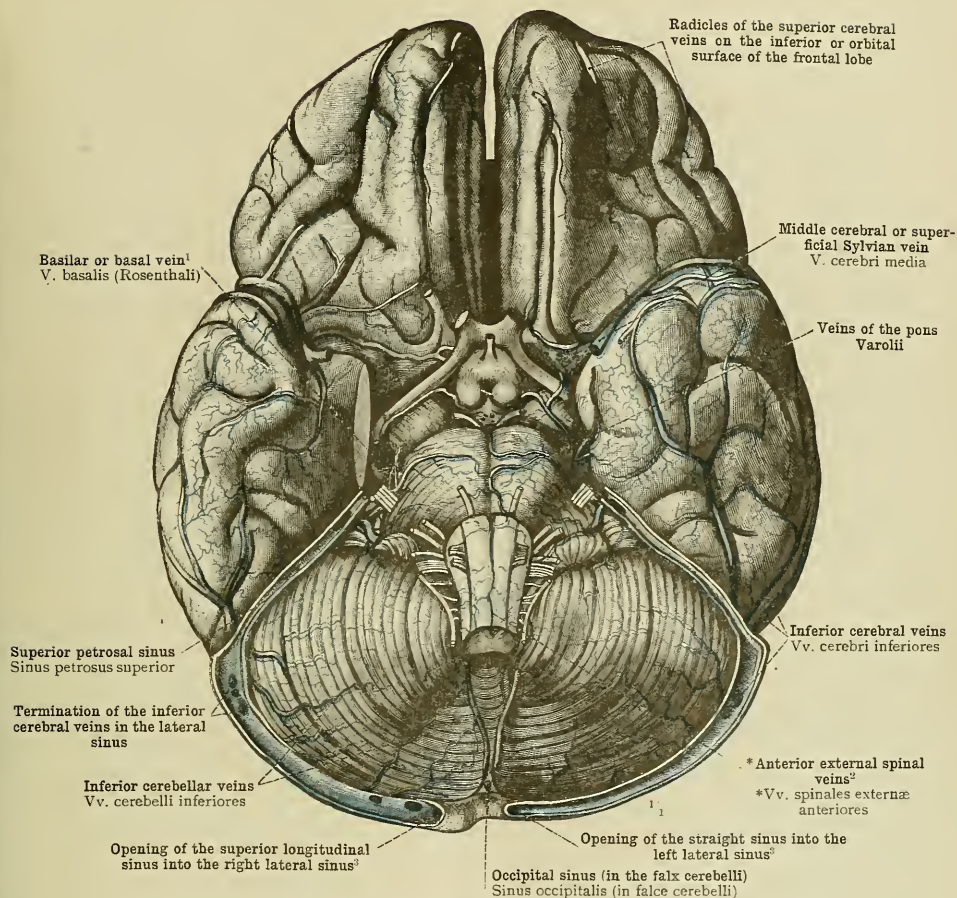
¹ See Appendix, note 297.² See Appendix, note 298.³ See Appendix, notes 264 and 266.

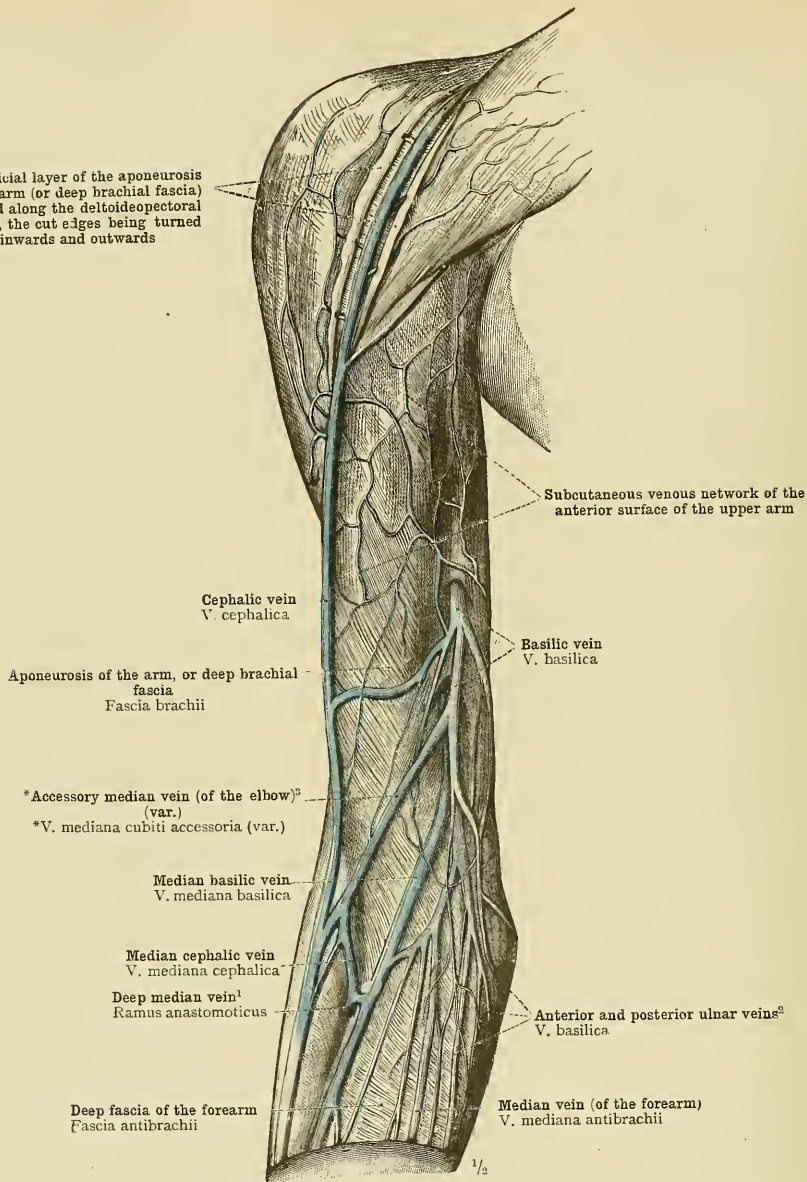
FIG. 1086—THE VEINS OF THE BASE OF THE BRAIN: THE MIDDLE CEREBRAL OR SUPERFICIAL SYLVIAN VEIN, VENA CEREBRI MEDIA; THE INFERIOR CEREBRAL VEINS, VENÆ CEREBRI INFERIORES; THE RADICLES AND THE TRUNK OF THE BASILAR OR BASAL VEIN, VENA BASALIS ROSENTHALI (see Appendix, note 297); THE VEINS OF THE PONS VAROLII, AND THE INFERIOR CEREBELLAR VEINS, VENÆ CEREBELLI INFERIORES.

The brain was removed from the cranial cavity, together with the tentorium cerebelli, so that along the attached borders of the tentorium the lateral sinuses and the inferior petrosal sinuses were opened from below. The frontal lobes were drawn a little apart, in order to display the veins on their internal or mesial surfaces. The right temporal lobe was drawn away from the cerebral peduncle, and a sufficient portion of this lobe was removed to expose the trunk of the basilar or basal vein (vena basalis Rosenthalii).

VENÆ EXTREMITATUM
SUPERIORUM ET INFERIORUM

THE VEINS OF THE UPPER AND
LOWER LIMBS

Superficial layer of the aponeurosis of the arm (or deep brachial fascia) divided along the deltoideopectoral groove, the cut edges being turned inwards and outwards



¹ See Appendix, note 393.

² Called by Macalister *anterior* and *posterior superficial ulnar veins*. See Appendix, note 396.

³ See Appendix, note 395.

FIG. 1087.—THE SUBCUTANEOUS VEINS OF THE FRONT OF THE SHOULDER, THE FRONT OF THE ARM, AND THE FLEXURE OF THE ELBOW.

Cutaneous Veins of the Arm.

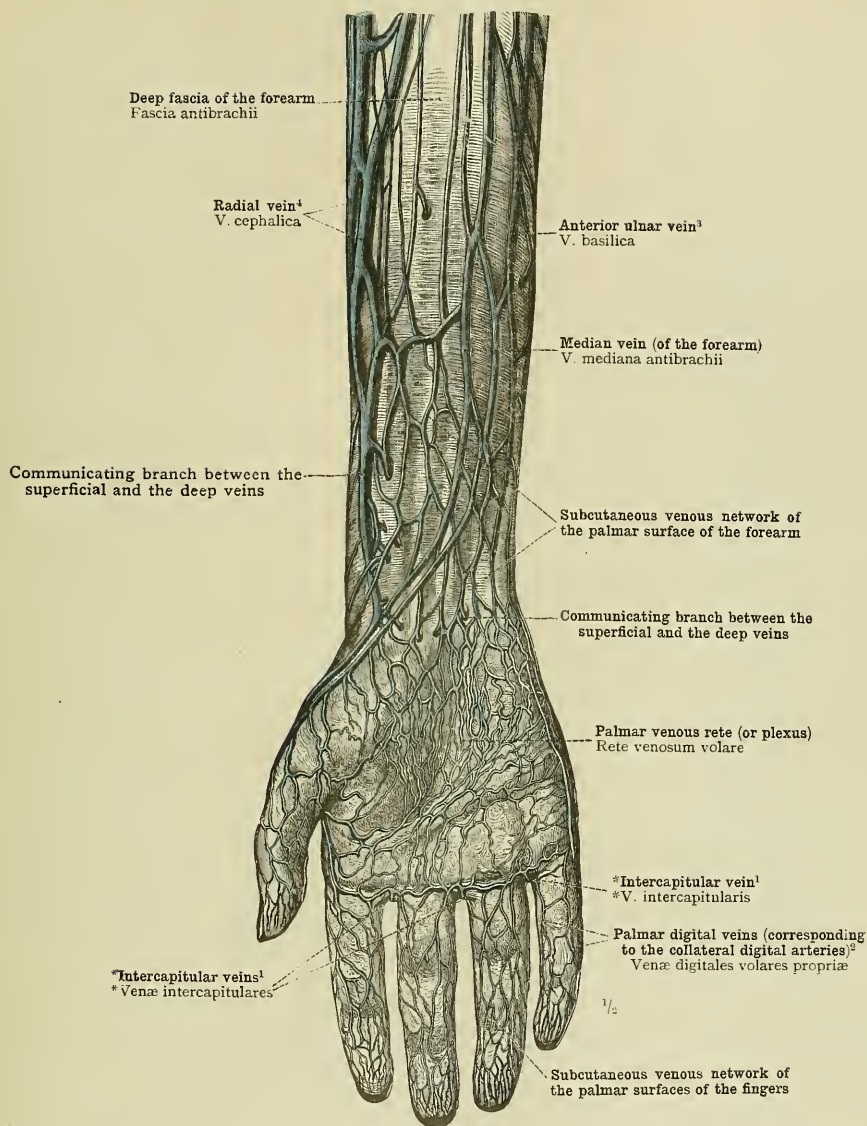
¹ See Appendix, note 390.³ Called by Macalister the *anterior superficial ulnar vein*. See Appendix, note 396.² See Appendix, note 391.⁴ See Appendix, note 395.

FIG. 1088.—THE SUBCUTANEOUS VEINS OF THE PALMAR SURFACE OF THE FOREARM AND HAND.

Cutaneous Veins of the Arm.

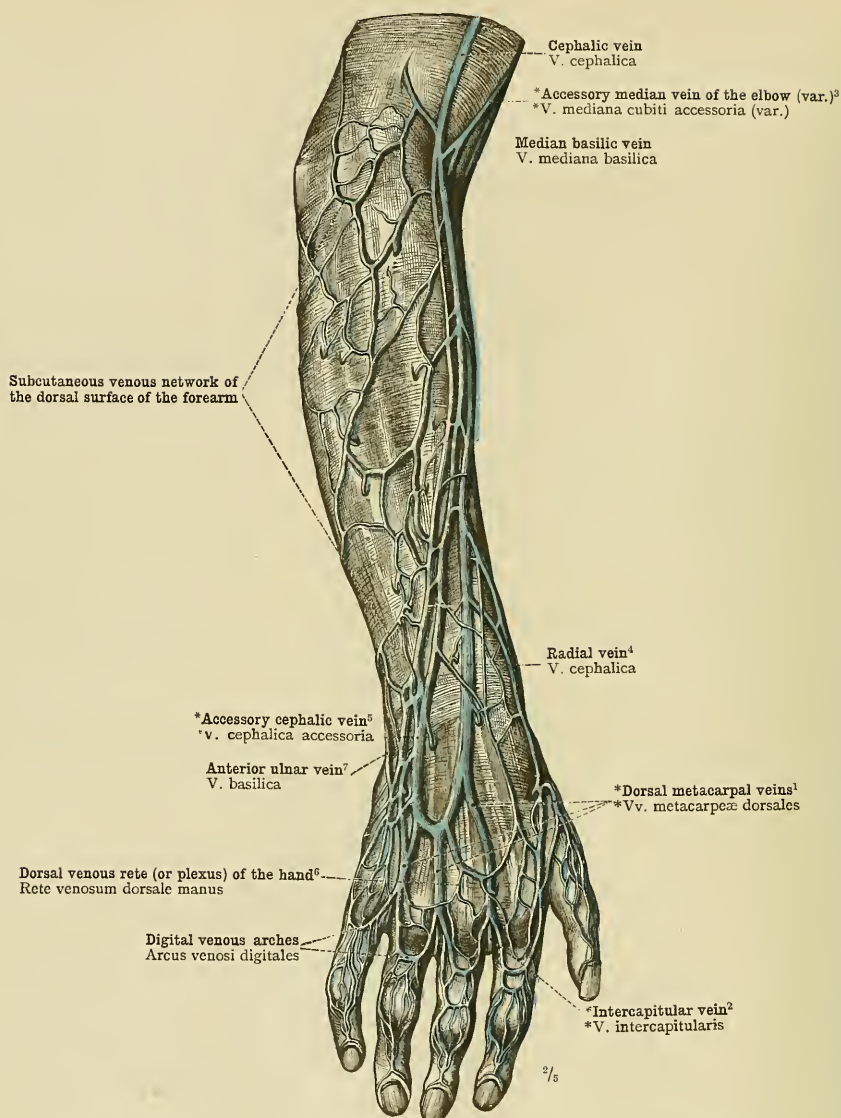
¹ See Appendix, note 3⁷².⁴ See Appendix, note 3⁷³.⁷ Called by Macalister the *anterior superficial ulnar vein*. See Appendix, note 3⁷⁶.² See Appendix, note 3⁷⁰.⁵ See Appendix, note 3⁷³.³ See Appendix, note 3⁷⁸.⁶ See Appendix, note 3⁷⁴.

FIG. 1089.—THE SUBCUTANEOUS VEINS OF THE DORSAL SURFACE OF THE FOREARM AND HAND.

Cutaneous Veins of the Arm.

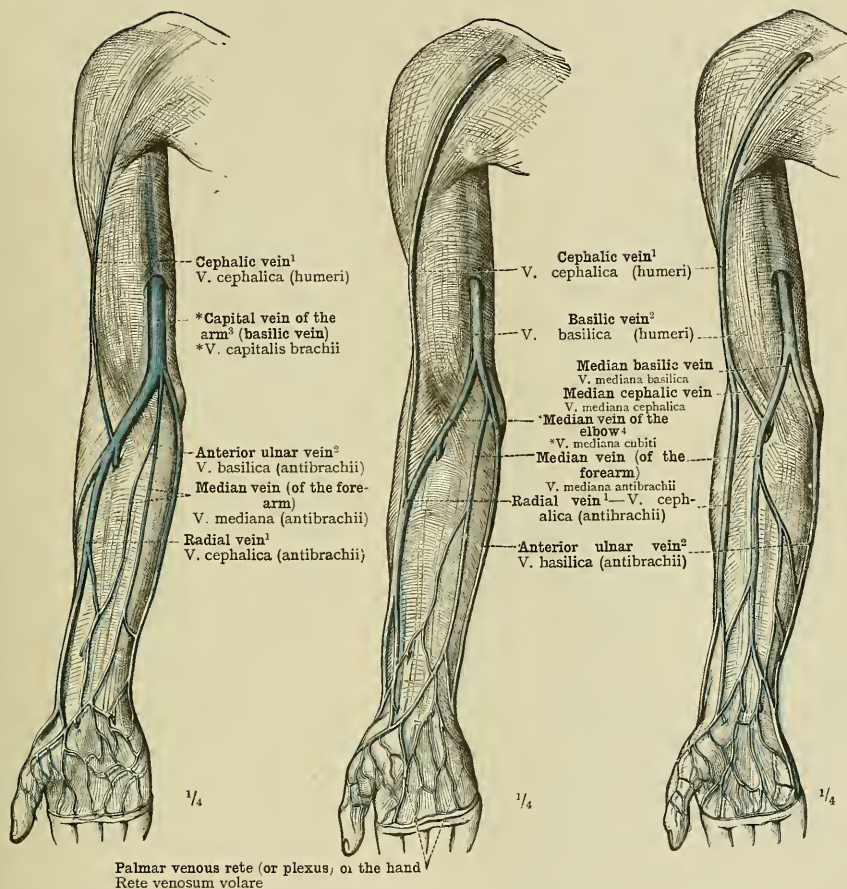
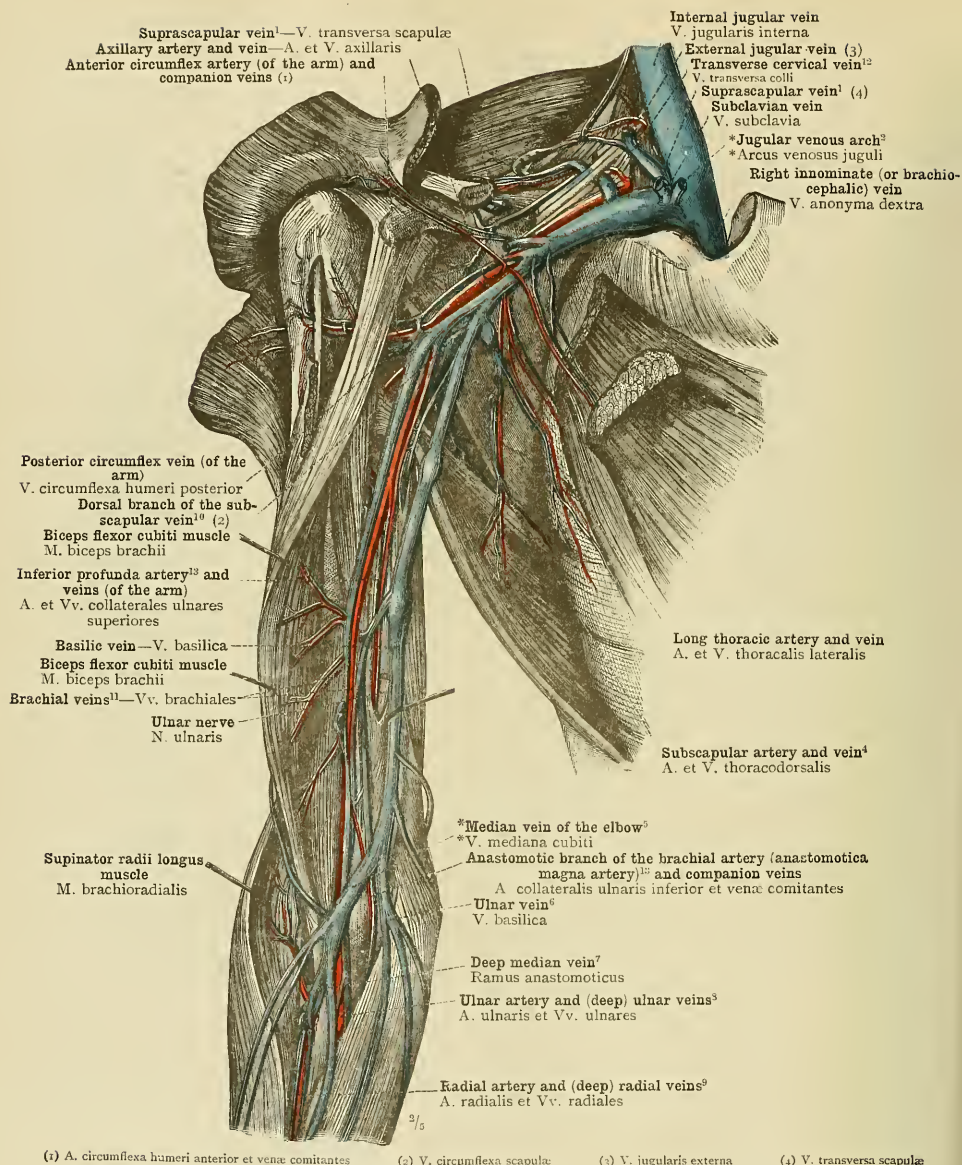
¹ See Appendix, note 305.² See Appendix, note 305.³ See Appendix, note 307.⁴ See Appendix, note 308.

FIG. 1090.—THE COMMONER VARIETIES OF THE SUBCUTANEOUS VEINS OF THE ARM (see Appendix, notes 307 and 308). THE *CAPITAL VEIN OF THE ARM, *VENA CAPITALIS BRACHII (K. von Bardleben), AND ITS COLLATERAL CHANNELS.



(1) A. circumflexa humeri anterior et vena comitantes

(2) V. circumflexa scapulae

(3) V. jugularis externa

(4) V. transversa scapulae

¹ Known also as the *transverse scapular* or *transverse humeral* vein.² Known also as the *external mammary artery and vein*.³ See Appendix, note 290.⁴ Or *vena comites* of the ulnar artery.⁵ Often called the *dorsalis scapulae* vein.⁶ See Appendix, note 310.⁷ See Appendix, note 123.⁸ See Appendix, note 302.⁹ See Appendix, note 311.¹⁰ Or *vena comites* of the radial artery.¹¹ Or *vena comites* of the brachial artery.¹² See Appendix, note 299.

FIG. 1091.—THE DEEP VEINS AND ARTERIES OF THE (*GREATER) SUPRACLAVICULAR FOSSA (see Appendix, note 289), *FOSSA SUPRACLAVICULARIS MAJOR, OF THE AXILLA, AND OF THE FRONT OF THE UPPER ARM; THE CONNEXION BETWEEN THE SUPERFICIAL AND THE DEEP VEINS OF THE FLEXURE OF THE ELBOW.

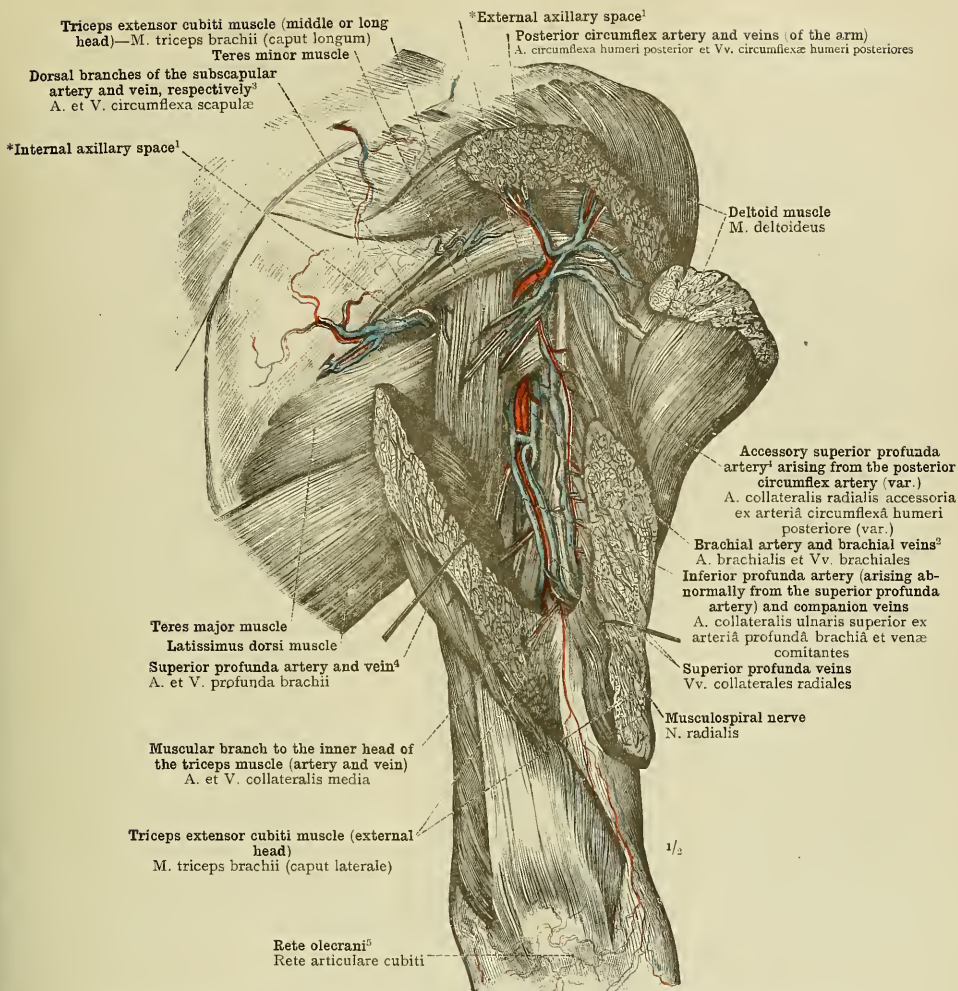


FIG. 1092.—THE DEEP VEINS AND ARTERIES OF THE DORSAL SURFACE OF THE RIGHT SHOULDER AND UPPER ARM; SEEN FROM BEHIND.

¹ *Internal and *External Axillary Spaces.—For an account of these, see note ¹ to p. 312, in Part III. The *internal axillary space is called by Macalister the subscapular triangle, and the *external axillary space is called by Macalister the quadrilateral space.—Fr.

² Or *venae comites* of the brachial artery.

⁴ See Appendix, note 229.

⁵ See Appendix, note 212.

A horizontal incision was made through the hinder part of the deltoid muscle somewhat above the middle of its vertical extent, the margins of the incision were turned upwards and downwards, and the teres minor muscle was drawn a little upwards, in order to expose the vessels passing through the *axillary spaces (see note ¹ above). The external head of the triceps extensor cubiti muscle was divided by a longitudinal incision, and the segments were drawn apart, in order to expose the ramification of the superior profunda vessels.

Deep Veins of the Shoulder and the Upper Arm.

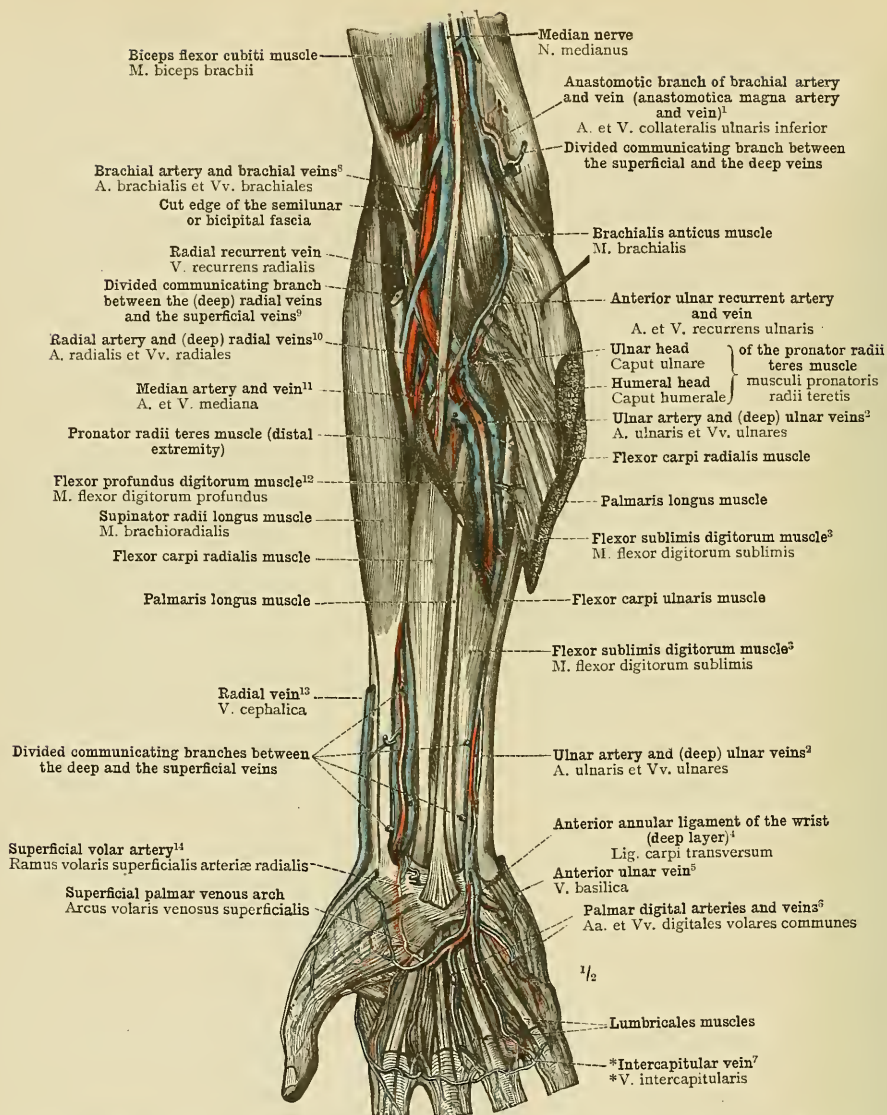
¹ See Appendix, note 299.⁴ See Appendix, note 214.⁶ See Appendix, notes 213 and 391.⁸ Or *venæ comites of the brachial artery*.¹⁰ Or *venæ comites of the radial artery*.¹² Or *flexor perforans muscle*.¹⁴ Often known in England by the Latin name of *superficialis volæ artery*.² Or *venæ comites of the ulnar artery*.⁵ Or *anterior superficial ulnar vein*, according to Macalister. See Appendix, note 391.⁷ See Appendix, note 390.⁹ This probably represents the *deep median vein* of English anatomists.—Tr.¹¹ Called by Macalister *comites nervi mediani artery and vein*.¹³ Or *superficial radial vein*, according to Macalister. See Appendix, note 275.

FIG. 1093.—THE DEEP VEINS AND ARTERIES OF THE FLEXURE OF THE ELBOW AND OF THE PALMAR SURFACE OF THE FOREARM; THE SUPERFICIAL PALMAR ARTERIAL AND VENOUS ARCHES.

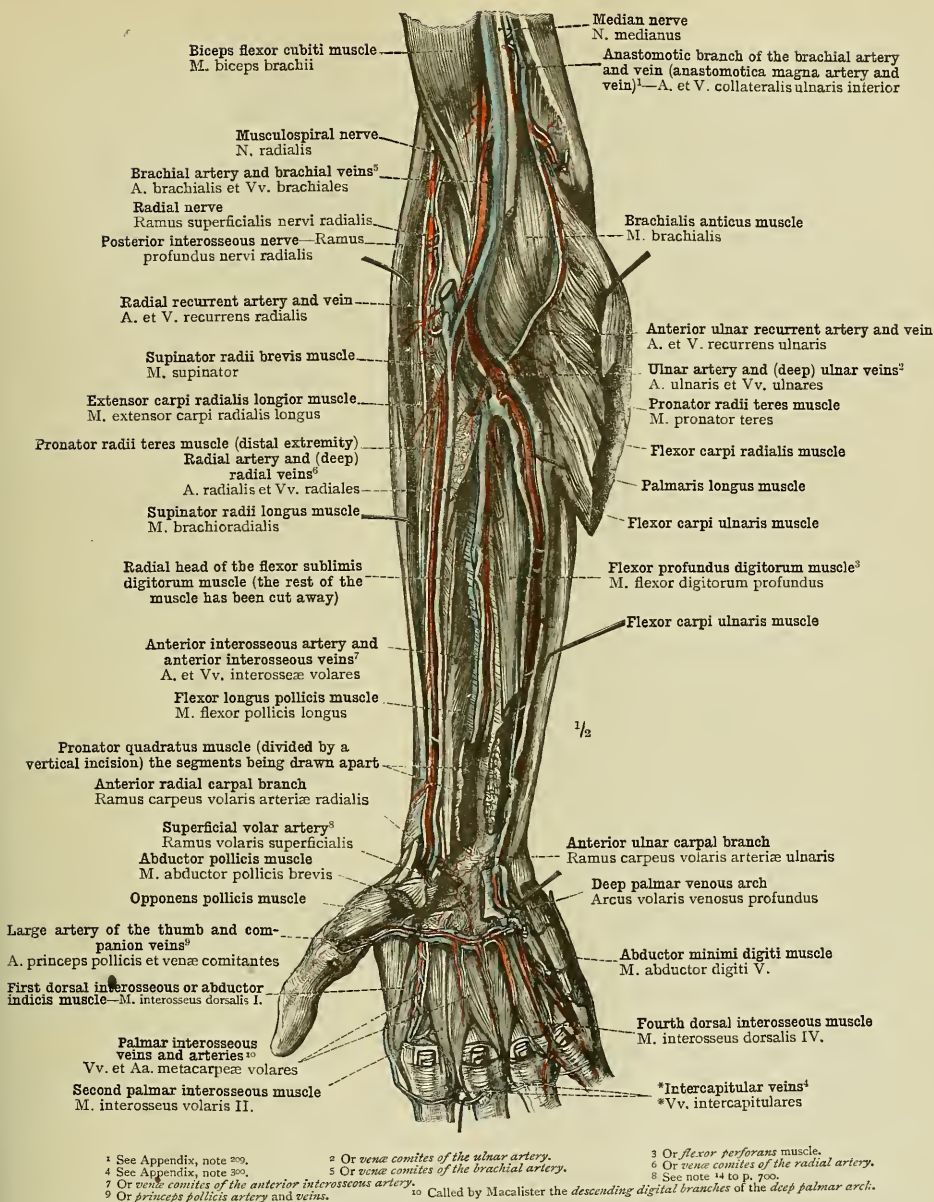
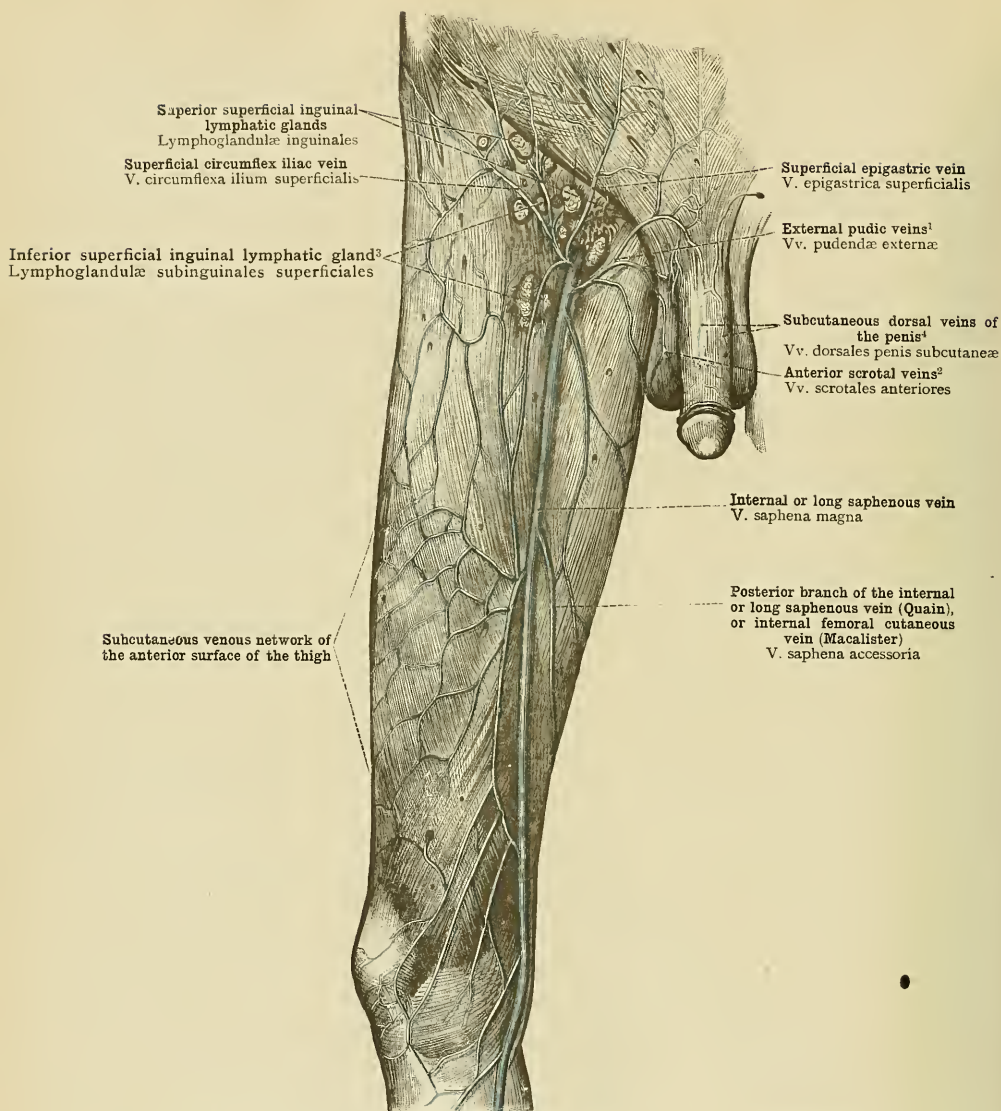
¹ See Appendix, note 299.² Or *vena comites* of the ulnar artery.³ Or *flexor perforans* muscle.⁴ See Appendix, note 300.⁵ Or *vena comites* of the brachial artery.⁶ Or *vena comites* of the radial artery.⁷ Or *vena comites* of the anterior interosseous artery.⁸ See note 14 to p. 700.⁹ Or *princeps pollicis* artery and veins.¹⁰ Called by Macalister the descending digital branches of the deep palmar arch.

FIG. 1094.—THE DEEP VEINS AND ARTERIES OF THE FLEXURE OF THE ELBOW, AND THEIR CONNEXION WITH THE DEEP VEINS OF THE PALMAR SURFACE OF THE FOREARM; THE DEEP PALMAR ARTERIAL AND VENOUS ARCHES.

Deep Veins of the Forearm and Hand.



¹ According to Macalister, *pubic* tributaries of the internal or long saphenous vein.

³ Often called the *femoral lymphatic glands*.

² See Appendix, note 13^g.

⁴ See Appendix, note 274.

FIG. 1095.—THE CUTANEOUS VEINS OF THE ANTERIOR AND INNER SIDES OF THE RIGHT THIGH, OF THE LOWER PART OF THE FRONT OF THE ABDOMEN, AND OF THE MALE EXTERNAL GENITAL ORGANS. THE INTERNAL OR LONG SAPHEOUS VEIN WITH ITS POSTERIOR BRANCH (THE INTERNAL FEMORAL CUTANEOUS VEIN, ACCORDING TO MACALISTER), VENA SAPHENA MAGNA ET VENA SAPHENA ACCESSORIA; THE SUPERFICIAL LYMPHATIC GLANDS OF THE INGUINAL AND SUBINGUINAL REGIONS.

Cutaneous Veins of the Lower Limb.

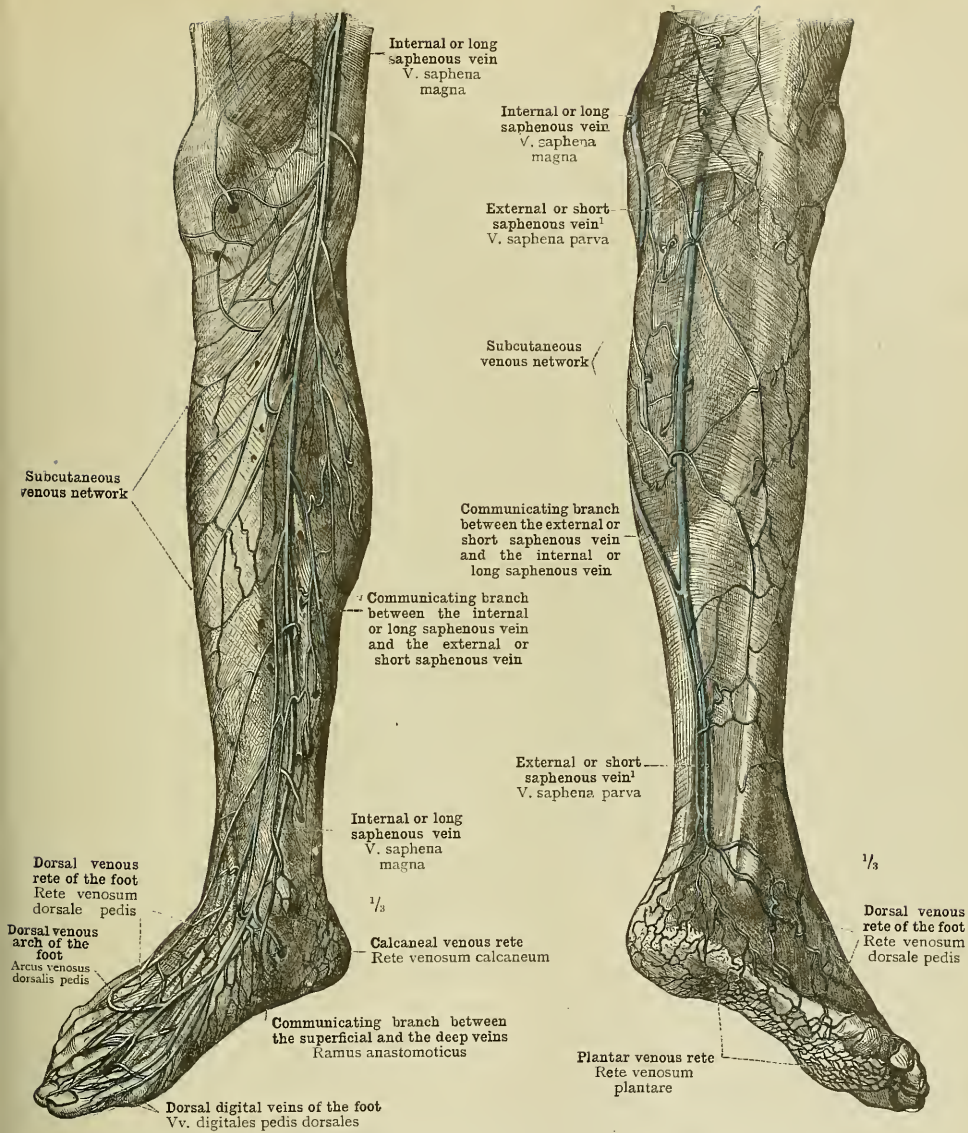
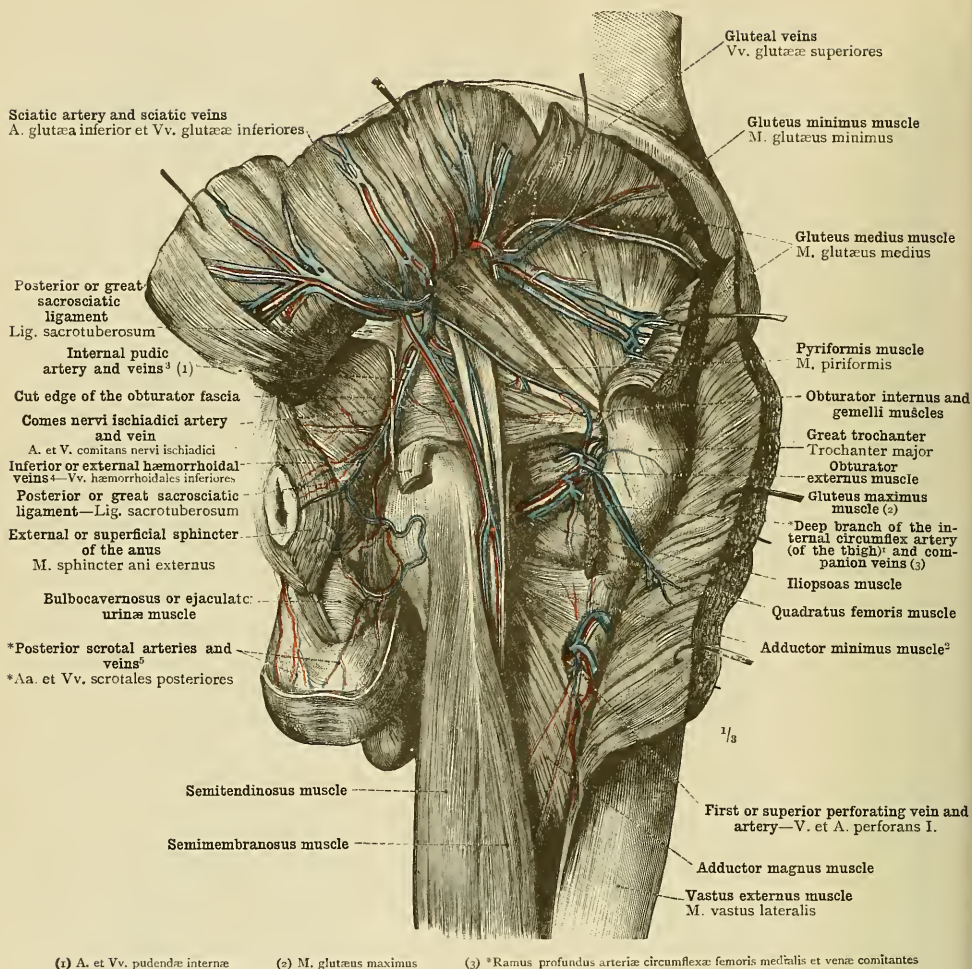


FIG. 1096.—SEEN FROM THE FRONT AND THE INNER SIDE.

FIG. 1097.—SEEN FROM BEHIND AND THE OUTER SIDE.

THE CUTANEOUS VEINS OF THE LEG AND THE FOOT: THE INTERNAL OR LONG SAPHENOUS VEIN, VENA SAPHENA MAGNA, AND THE EXTERNAL OR SHORT SAPHENOUS VEIN, VENA SAPHENA PARVA, WITH THE TRIBUTARIES OF THESE VEINS

¹ Called by Macalister the *sural vein*.



¹ The so-called "deep branch of the internal circumflex artery" is by English anatomists regarded as the continuation of that vessel itself. See Appendix, note ²²⁴.

³ See Appendix, note ¹³⁹.

⁴ Called by Macalister the *anal veins*.

² See note ² to p. 644.

⁵ See Appendix, note ¹³⁸.

FIG. 1098.—THE DEEP VEINS AND ARTERIES OF THE RIGHT GLUTEAL REGION AND ISCHIORECTAL FOSSA, WITH THE SUPERFICIAL VESSELS OF THE POSTERIOR SURFACE OF THE SCROTUM.

The gluteus maximus and gluteus medius muscles and the posterior or great sacrospinous ligament were cut across and the segments were drawn apart, and the greater part of the quadratus femoris muscle was cut away.

Deep Veins of the Gluteal region.

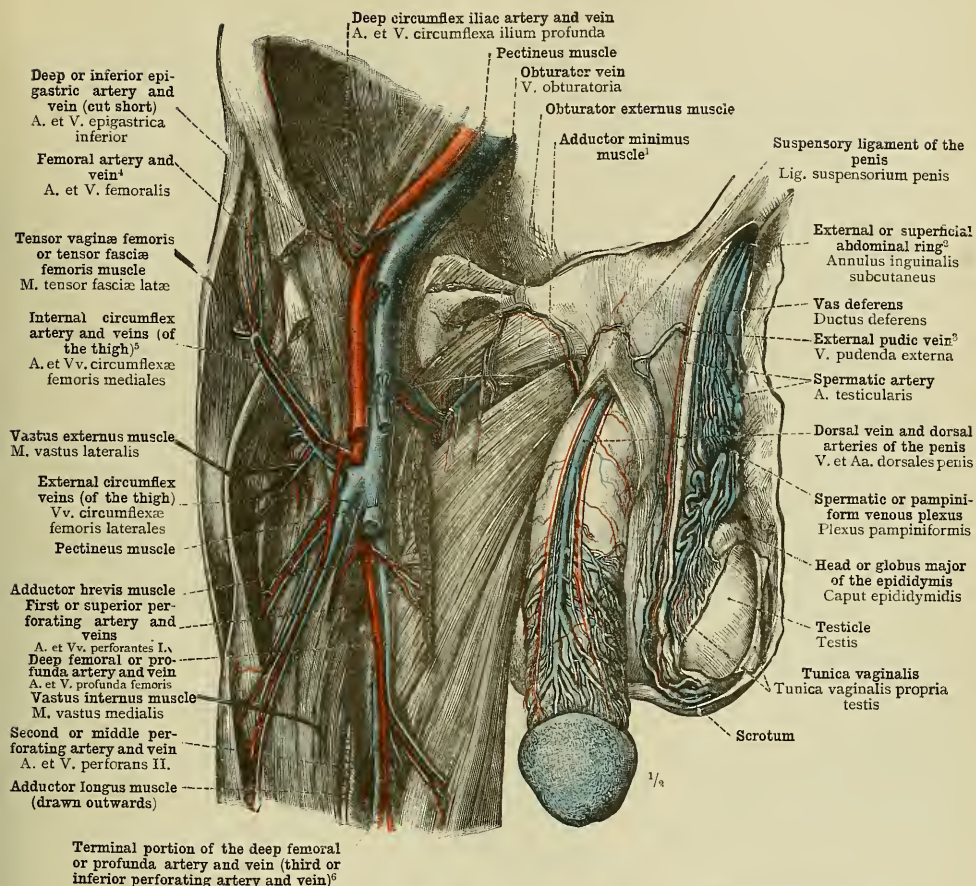
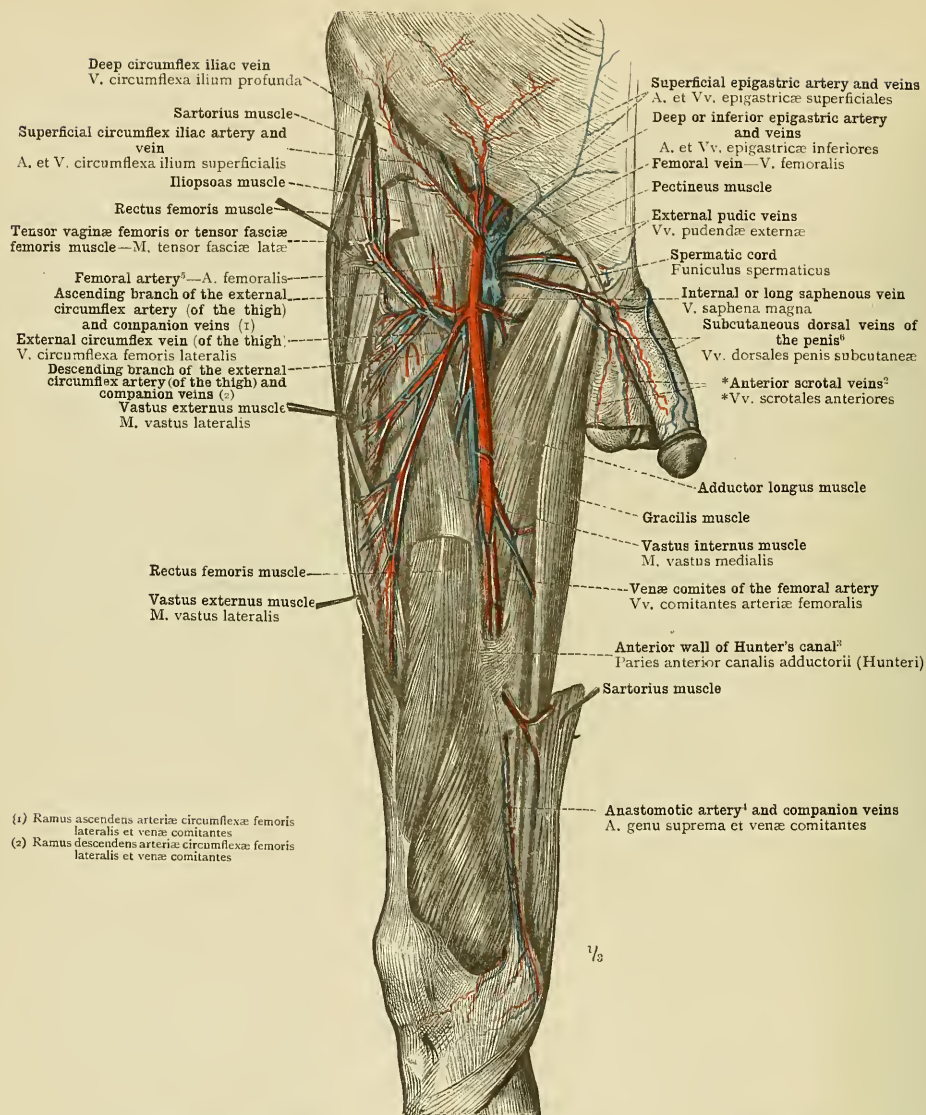
¹ See note ² to p. 644.⁴ See Appendix, note 223.² Or external inguinal aperture.⁵ See Appendix, note 224.³ Called by Macallister *pudic vein*.⁶ See Appendix, note 315.

FIG. 1099.—THE DISTRIBUTION OF THE DEEP FEMORAL OR PROFUNDA VEIN AND ARTERY, VENA ET ARTERIA PROFUNDA FEMORIS; OF THE OBTURATOR VESSELS, VASA OBTURATORIA; OF THE DORSAL VESSELS OF THE PENIS; AND OF THE VEINS OF THE TESTICLE.

The anterior wall of the abdomen was removed, together with Poupart's ligament (the superficial crural arch); the pectineus, adductor brevis, and adductor longus muscles were cut away close to their origin, in order to expose the obturator and the internal circumflex vessels. On the right side, the testis and the spermatic cord were removed; while on the left side these organs were retained, and the spermatic or pampiniform venous plexus was dissected out. On the penis, which was injected both by way of the dorsal vein and by penetration of one of the corpora cavernosa, the deep-seated dorsal vessels were exposed.



¹ Or *pubic veins*, according to Macalister.

⁴ See Appendix, note 226.

² See Appendix, note 258.

⁵ See Appendix, note 223.

³ See Appendix, note 228.

⁶ See Appendix, note 274.

FIG. 1100.—THE FEMORAL ARTERY AND VEIN, ARTERIA ET VENA FEMORALIS, UNTIL THEIR ENTRANCE INTO HUNTER'S CANAL (see Appendix, note 225), AND THE DISTRIBUTION OF THE EXTERNAL CIRCUMFLEX ARTERY AND VEIN (OF THE THIGH), ARTERIA ET VENA CIRCUMFLEXA FEMORIS LATERALIS. RIGHT THIGH, SEEN FROM BEFORE.

The sartorius and rectus femoris muscles were in part removed, and the tensor vaginæ femoris and vastus externus muscles were drawn outwards.

Deep Veins of the Front of the Thigh.

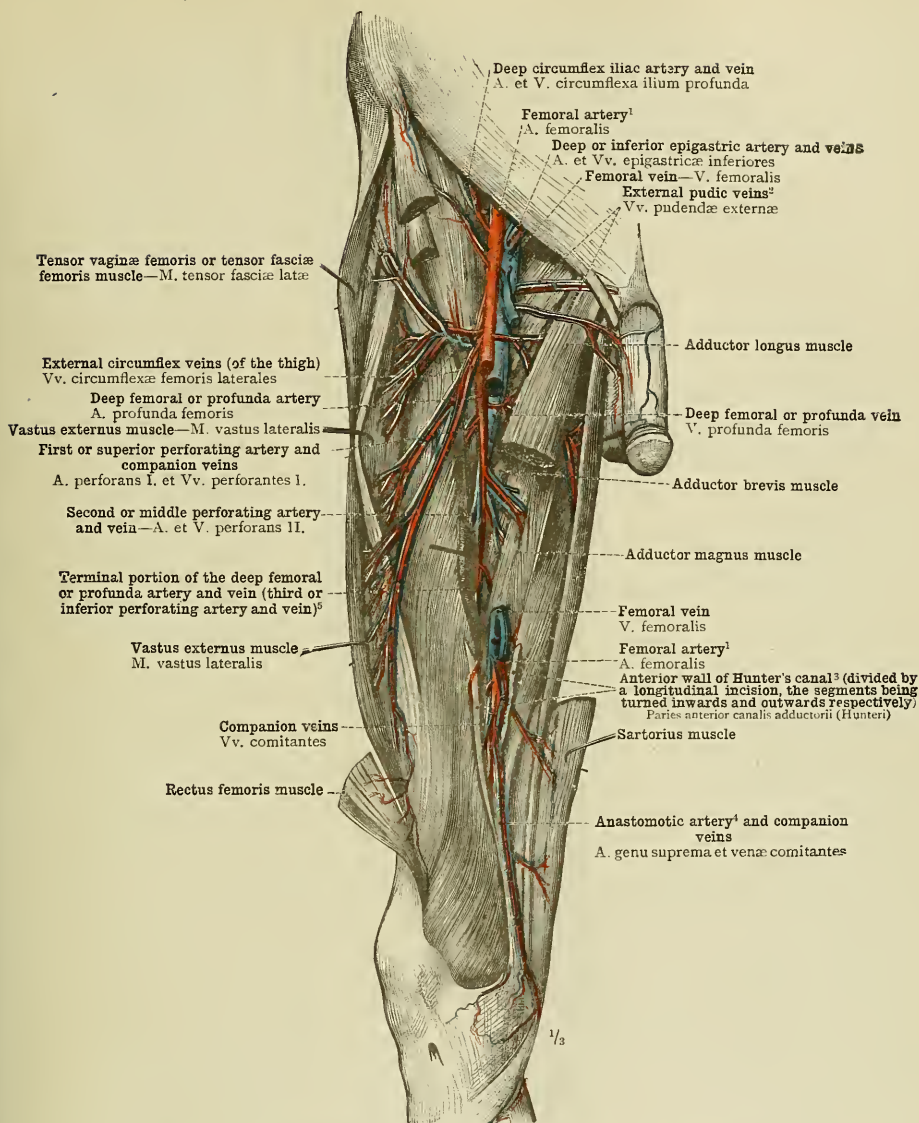
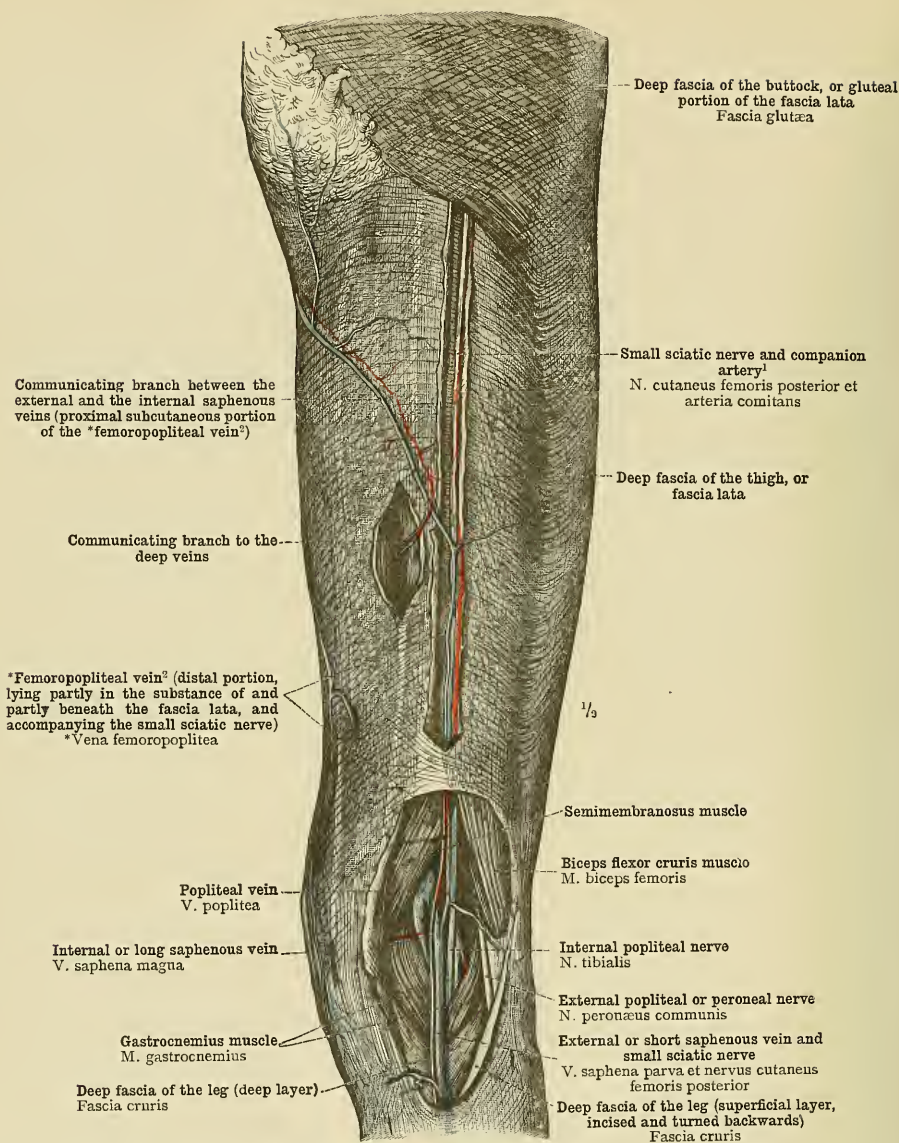
¹ See Appendix, note 227.⁴ See Appendix, note 228.² Called by Macalister the *pubic veins*.⁵ See Appendix, note 312.³ See Appendix, note 221.

FIG. 1101.—THE DEEP FEMORAL OR PROFUNDA ARTERY AND ITS COMPANION VEINS; RIGHT THIGH, SEEN FROM BEFORE.

In the preparation shown in Fig. 1100, a portion of the (superficial) femoral artery and vein were excised, part of the adductor longus muscle was removed, and Hunter's canal was opened from before.



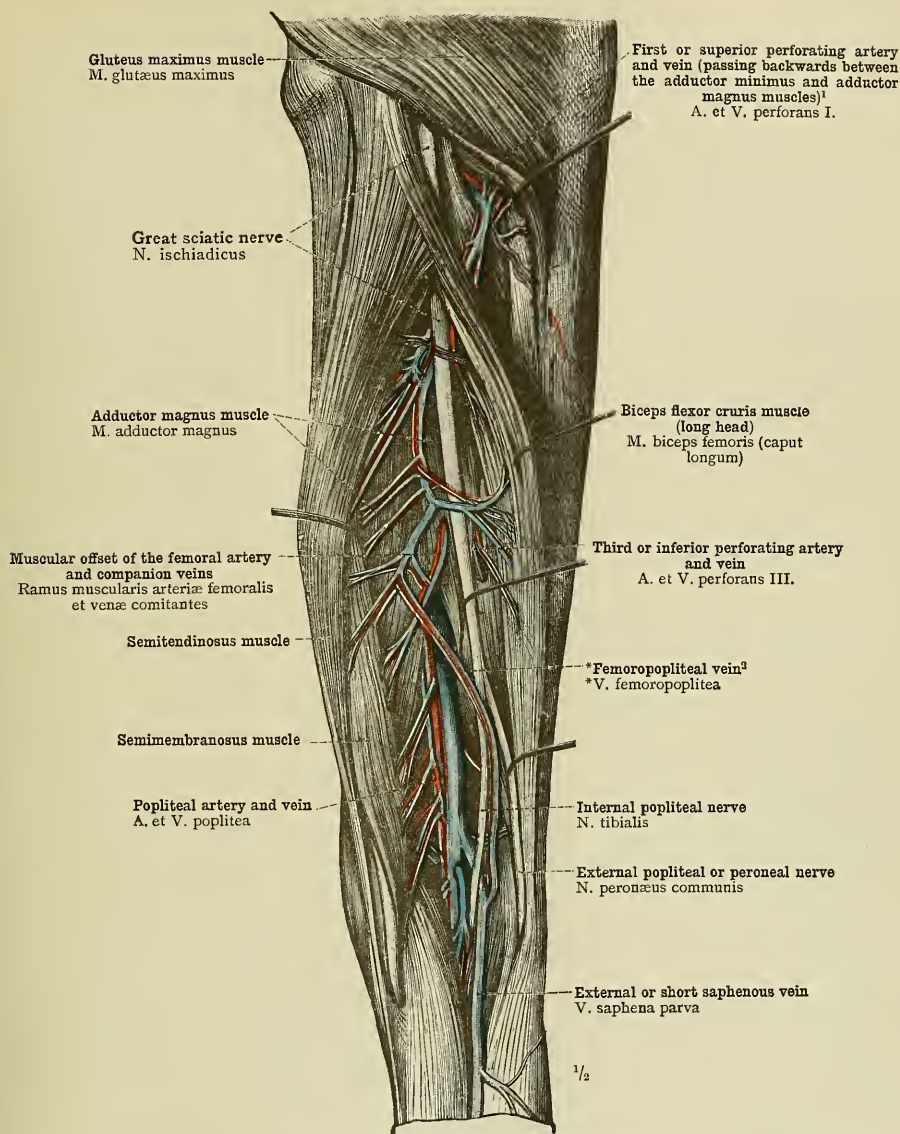
¹ This artery is one of the cutaneous branches of the sciatic artery.—Tr.

² See Appendix, note 313.

FIG 1102.—THE *FEMOROPOPLITEAL VEIN, *VENA FEMOROPOPLITEA (see Appendix, note 313), OF THE RIGHT THIGH.

The small sciatic nerve (nervus cutaneus femoris posterior), with its companion vessels, was exposed in its course between the layers of the fascia lata along the middle of the back of the thigh; and in the region of the ham the deep fascia was entirely removed.

Superficial Veins of the Back of the Thigh.



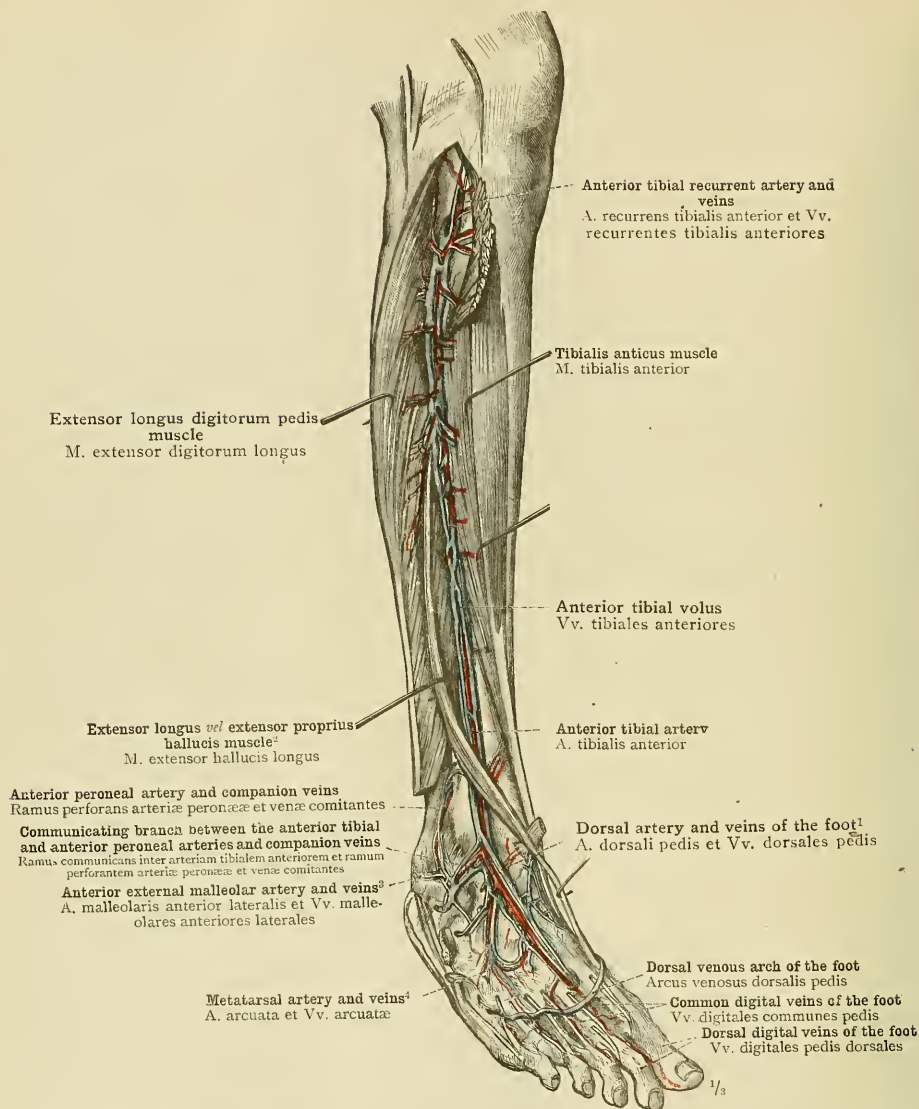
[†] See note ² to p. 644.

[‡] See Appendix, note 373.

FIG. 1103.—THE PERFORATING VEINS, VENÆ PERFORANTES, AND THEIR COMMUNICATION WITH THE EXTERNAL OR SHORT SAPHEOUS VEIN, DISSECTED OUT AT THE BACK OF THE RIGHT THIGH.

The biceps flexor cruris muscle was drawn as far outwards, and the inner hamstring muscles were drawn as far inwards, as possible.

Deep Veins of the Back of the Thigh.



¹ Often known in England by their Latin names of *dorsalis pedis artery and veins*.

² See note ² to p. 364, in Part III.

³ See Appendix, note ².

⁴ See Appendix, note ² 39.

FIG. 1104.—THE MUSCLES OF THE FRONT OF THE LEG WERE SEPARATED, THE PROXIMAL PORTION OF THE TIBIALIS ANTICUS MUSCLE WAS DETACHED FROM THE BONE AND TURNED FORWARDS, THE EXTENSOR BREVIS DIGITORUM PEDIS MUSCLE AND THE TENDONS OF THE EXTENSOR LONGUS DIGITORUM PEDIS MUSCLE WERE REMOVED FROM THE DORSUM OF THE TARSA.

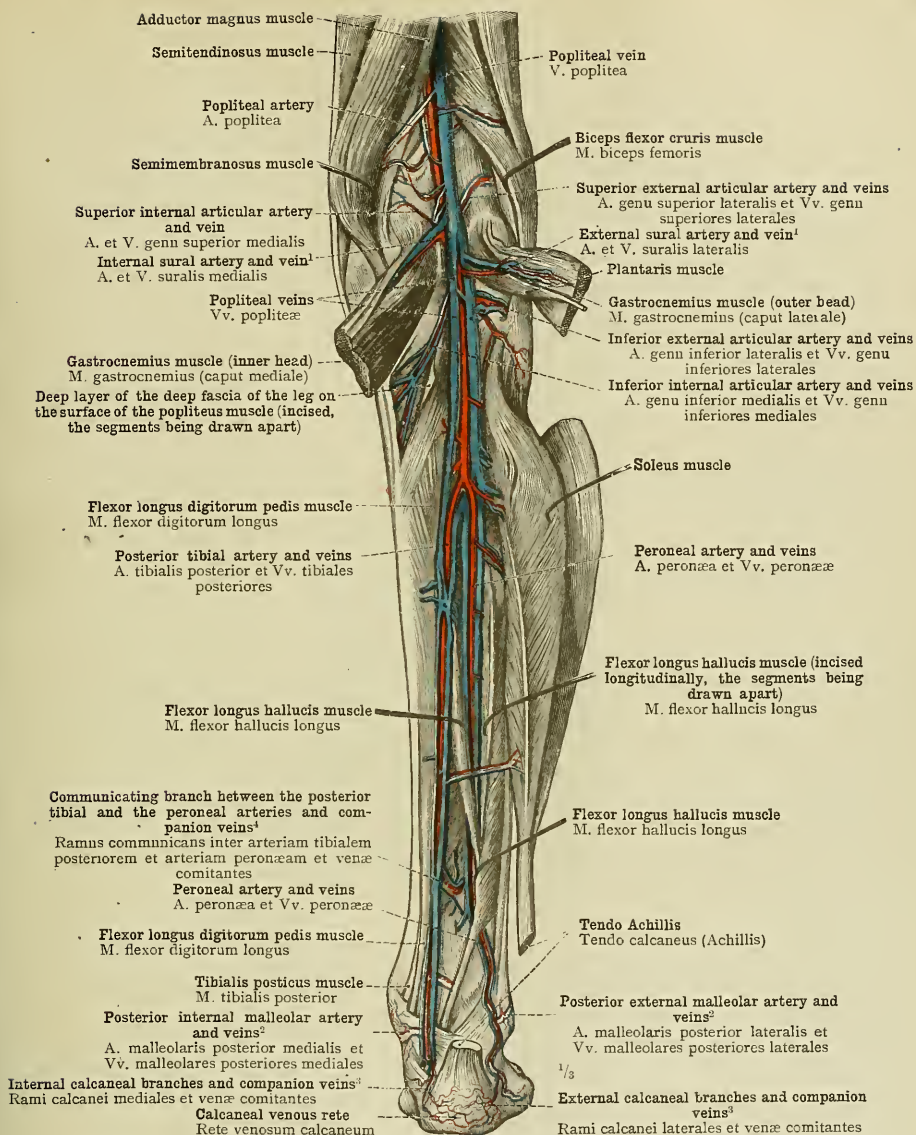
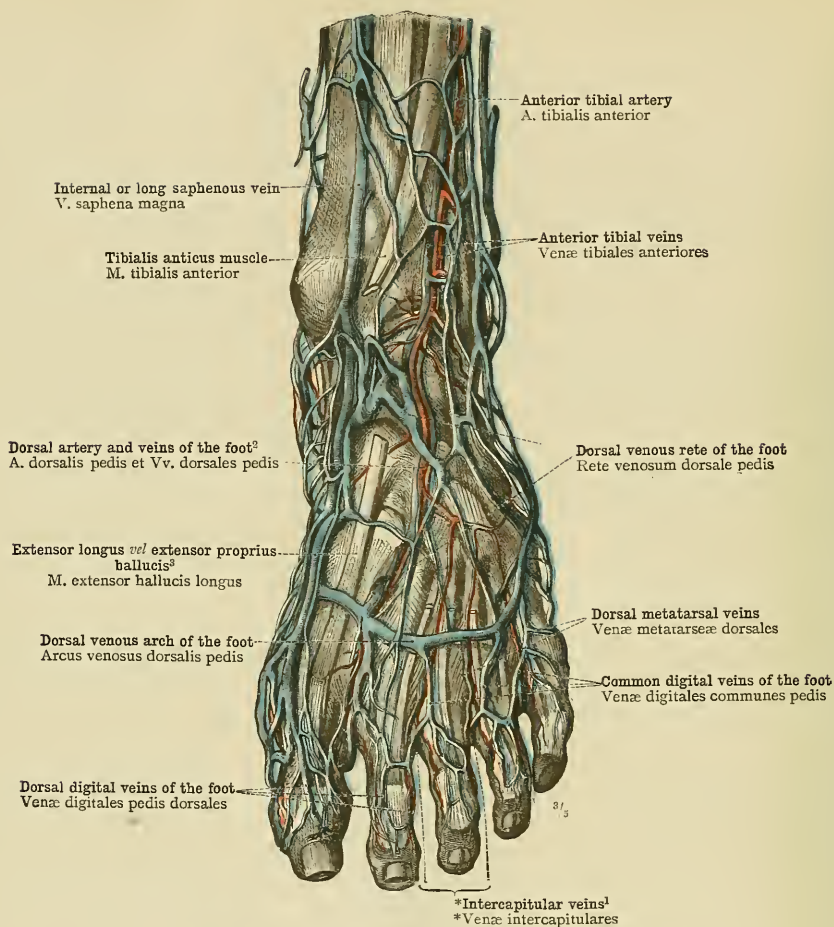
¹ See Appendix, note 23^e.² See Appendix, note 23^e.³ See Appendix, note 24^e.⁴ See Appendix, note 24^e.

FIG. 1105.—THE HAMSTRING MUSCLES AND THE PROXIMAL EXTREMITIES (INNER AND OUTER) OF THE GASTROCNEMIUS MUSCLE WERE DRAWN APART, THE TENDO ACHILLIS WAS CUT ACROSS TRANSVERSELY A LITTLE ABOVE THE TUBEROSITY OF THE CALCANEUM, THE SOLEUS MUSCLE WAS DETACHED FROM THE TIBIA AND WAS DRAWN OUTWARDS WITH THE GASTROCNEMIUS MUSCLE; THE FLEXOR LONGUS HALLUCIS MUSCLE WAS INCISED LONGITUDINALLY AND THE SEGMENTS WERE DRAWN APART



¹ The *intercapitular veins of the foot are homologous with those of the hand. See Appendix, note 3^o.

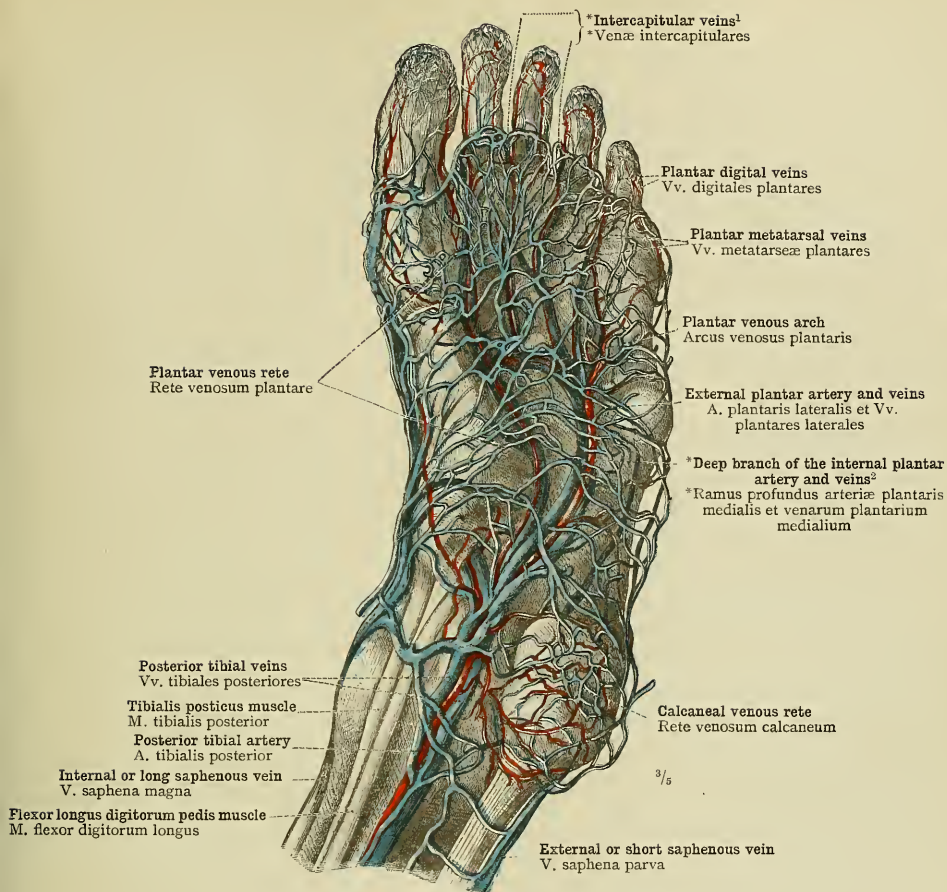
² Often known in England by their Latin name of *dorsalis pedis* artery and veins.

³ See note ² to p. 364, in Part III.

FIG. 1106.—THE SUPERFICIAL VEINS AND THE DEEP VEINS AND ARTERIES OF THE DORSUM OF THE FOOT: THE DORSAL DIGITAL VEINS OF THE FOOT, VENÆ DIGITALES PEDIS DORSALES, AND THE COMMON DIGITAL VEINS OF THE FOOT, VENÆ DIGITALES COMMUNES PEDIS; THE DORSAL METATARSAL VEINS, VENÆ METATARSÆ DORSALES, AND THE *INTERCAPITULAR VEINS (OF THE FOOT), *VENÆ INTERCAPITULARES (PEDIS); THE DORSAL VENOUS ARCH OF THE FOOT, ARCUS VENOSUS DORSALIS PEDIS, AND THE DORSAL VENOUS RETE OF THE FOOT, RETE VENOSUM DORSALE PEDIS; THE CONTINUITY OF THE DORSAL VEINS OF THE FOOT, VENÆ DORSALES PEDIS, WITH THE ANTERIOR TIBIAL VEINS, VENÆ TIBIALES ANTERIORES; THE INTERNAL OR LONG SAPHENOUS VEIN, VENA SAPHENA MAGNA.

Of the muscles of the front of the leg, the tibialis anticus muscle only was retained; on the dorsum of the foot, the extensor brevis digitorum pedis muscle was removed, but the distal extremities of the tendons of the extensor longus digitorum pedis muscle were retained.

Veins of the Dorsum of the Foot.



¹ See Appendix, note 390.

² See Appendix, note 391.

FIG. 1107.—THE SUPERFICIAL VEINS AND THE DEEP VEINS AND ARTERIES OF THE SOLE OF THE FOOT: THE PLANTAR VENOUS RETE, RETE VENOSUM PLANTARE, AND THE CALCANEAL VENOUS RETE, RETE VENOSUM CALCANEUM; THE PLANTAR DIGITAL VEINS, VENÆ DIGITALES PLANTARES, AND THE *INTERCAPITULAR VEINS (OF THE FOOT), *VENÆ INTERCAPITULARES (PEDIS); THE PLANTAR METATARSAL VEINS, VENÆ METATARSÆ PLANTARES, AND THE PLANTAR VENOUS ARCH, ARCUS VENOSUS PLANTARIS; THE CONTINUITY OF THE INTERNAL AND EXTERNAL PLANTAR VEINS, VENÆ PLANTARES MEDIALIS ET LATERALIS, WITH THE POSTERIOR TIBIAL VEINS, VENÆ TIBIALES POSTERIORES; THE PLANTAR RADICLES OF THE INTERNAL OR LONG AND THE EXTERNAL OR SHORT SAPHENOUS VEINS, VENÆ SAPHENÆ, MAGNA ET PARVA.

The muscles of the sole of the foot were entirely removed, the superficial and deep bloodvessels being left intact.

Veins of the Sole of the Foot.

SYSTEMA LYMPHATICUM
THE LYMPHATIC SYSTEM

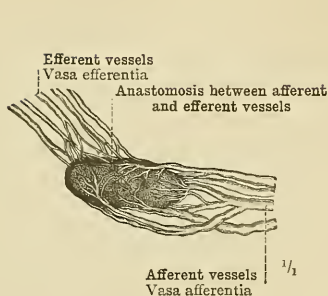


FIG. 1108.—LYMPHATIC GLAND (HUMAN) FROM THE INTERNAL ILIAC GROUP, OF WHICH THE AFFERENT AND EFFERENT VESSELS HAVE BEEN INJECTED.

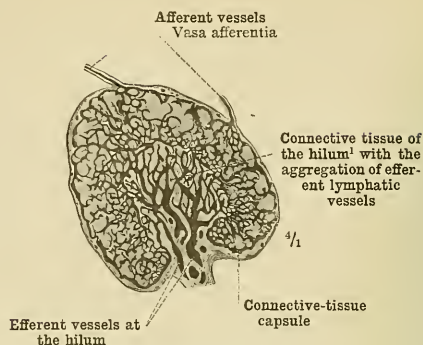


FIG. 1109.—TRANSVERSE SECTION THROUGH ONE OF THE INTERNAL ILIAC LYMPHATIC GLANDS OF MAN IN WHICH THE LYMPHATIC VESSELS HAVE BEEN INJECTED WITH PRUSSIAN BLUE AND THE GLAND HAS SUBSEQUENTLY BEEN HARDENED IN ALCOHOL.

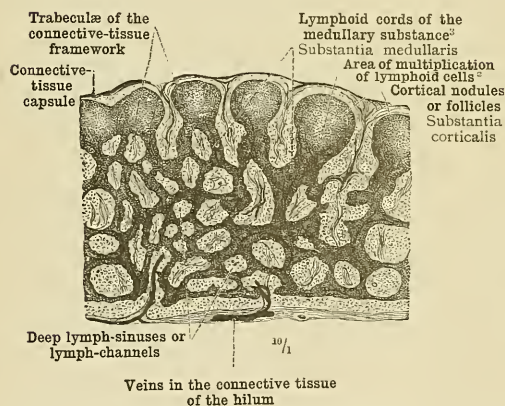


FIG. 1110.—SECTION OF A MESENTERIC LYMPHATIC GLAND, HARDENED IN ALCOHOL.

The bloodvessels, which were injected with Prussian blue, are tinted deep black.

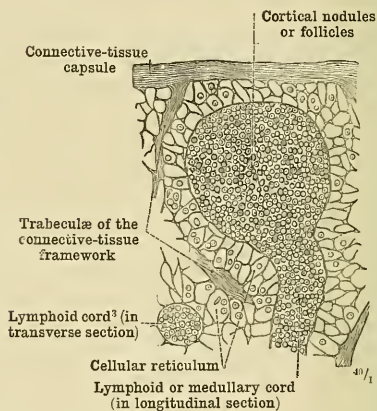


FIG. 1111.—CORTICAL NODULES OR FOLLICLES AND LYMPHOID OR MEDULLARY CORDS OF A MESENTERIC LYMPHATIC GLAND, SEEN IN TRANSVERSE SECTION, AND MAGNIFIED FORTY DIAMETERS.

¹ *Connective Tissue of the Hilum.*—"In the region of the hilum, where the efferent vessels leave the gland, the trabeculae combine with the connective-tissue capsule to form a dense mass of connective tissue, the *Hilustroma* in the interior of which the radicles of the efferent lymphatic vessels are aggregated" (Von Langer and Toldt, *op. cit.*, pp. 561, 562). It is this term *Hilustroma* which I have translated by the phrase "connective tissue of the hilum."—T.R.

² *Keimcentrum* in the German original.

³ Or *medullary cords* (Foster).

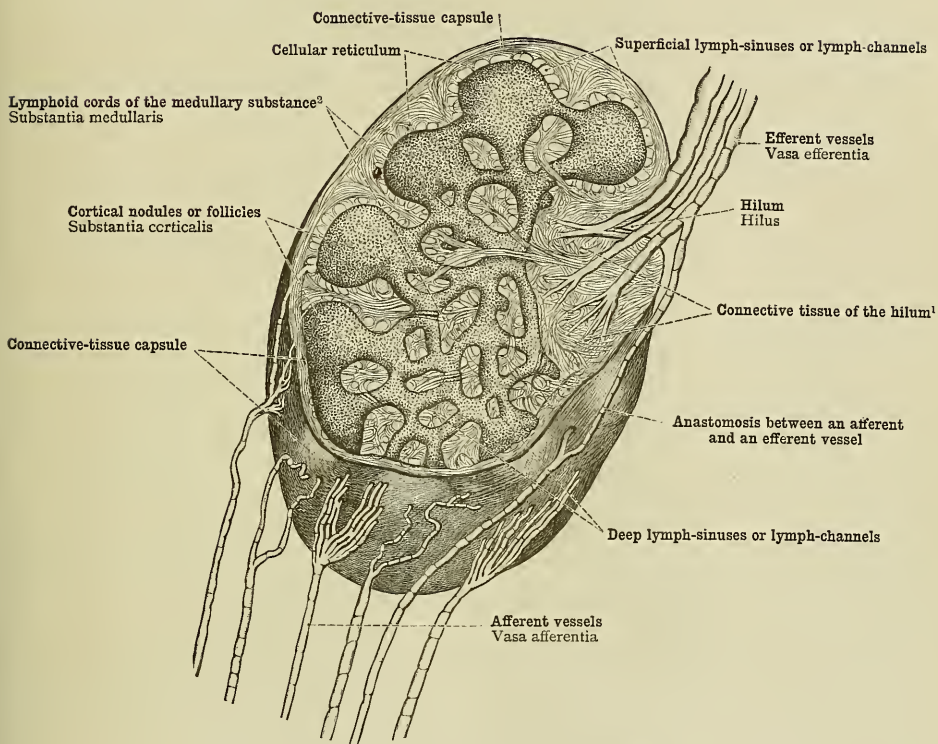
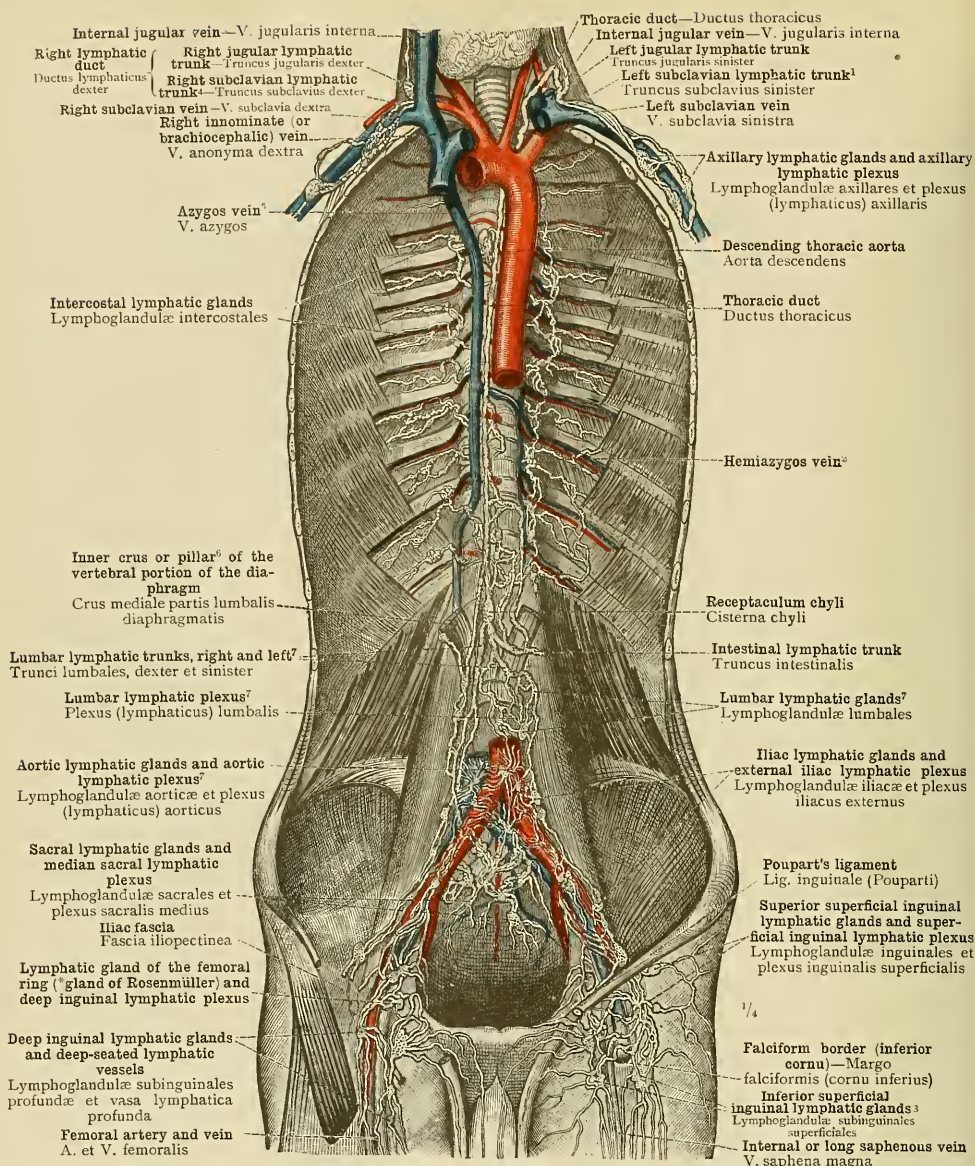
¹ See note ¹ to p. 716.² Or medullary cords (Foster).

FIG. 1112.—DIAGRAMMATIC REPRESENTATION OF THE INTERNAL STRUCTURE OF A LYMPHATIC GLAND WITH AFFERENT AND EFFERENT LYMPHATIC VESSELS, VASA AFFERENTIA ET VASA EFFERENTIA.

Lymphoglandulæ—Lymphatic glands.



¹ According to Quain, the left axillary lymphatic trunk.

³ Often called the femoral lymphatic glands.

⁵ Known also as the right or large azygos vein.

⁷ See Appendix, note 314.

² Known also as the left lower or small azygos vein.

⁴ According to Quain, the right axillary lymphatic trunk.

⁶ See note ¹ to p. 286, in Part III.

FIG. 1113.—THE THORACIC DUCT, DUCTUS THORACICUS, AND THE LYMPHATIC TRUNKS OPENING INTO THAT VESSEL; THE LYMPHATIC VESSELS AND LYMPHATIC GLANDS OF THE POSTERIOR WALL OF THE ABDOMEN; THE SUPERFICIAL AND DEEP LYMPHATIC VESSELS AND LYMPHATIC GLANDS OF THE GROIN.

Ductus thoracicus—The thoracic duct.

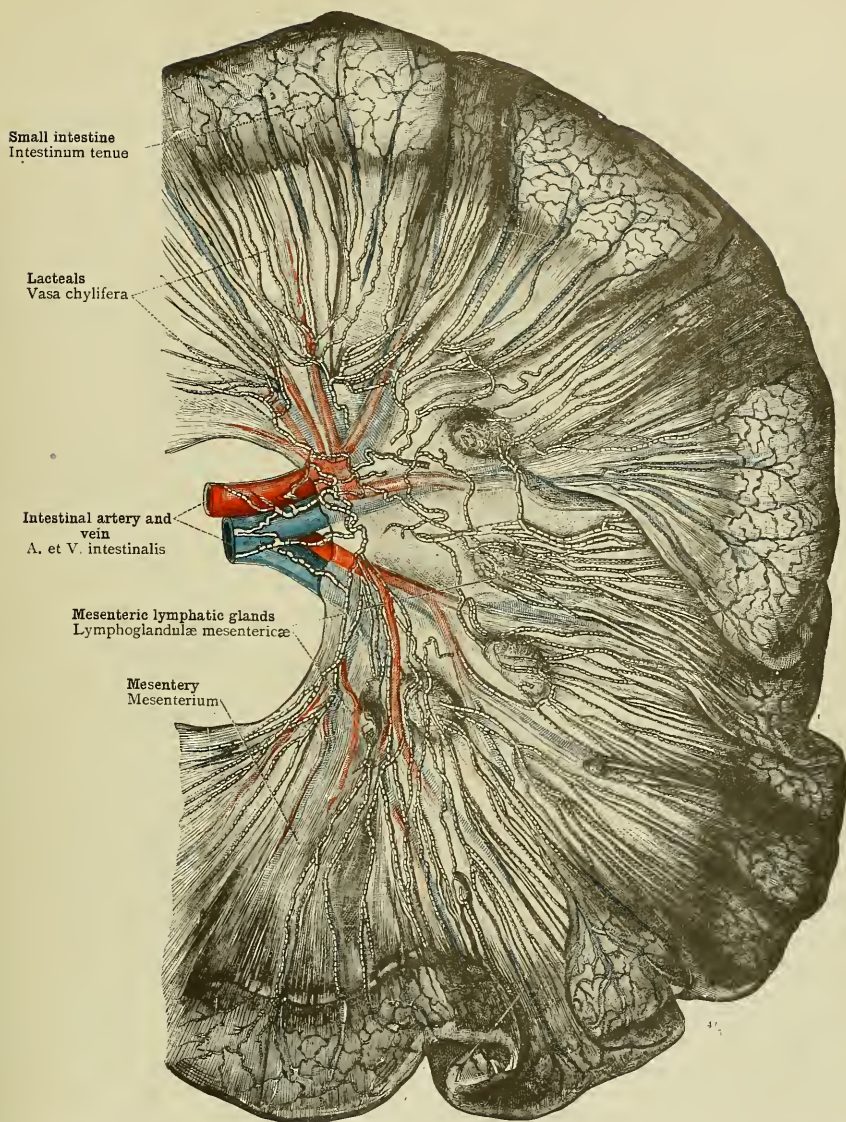
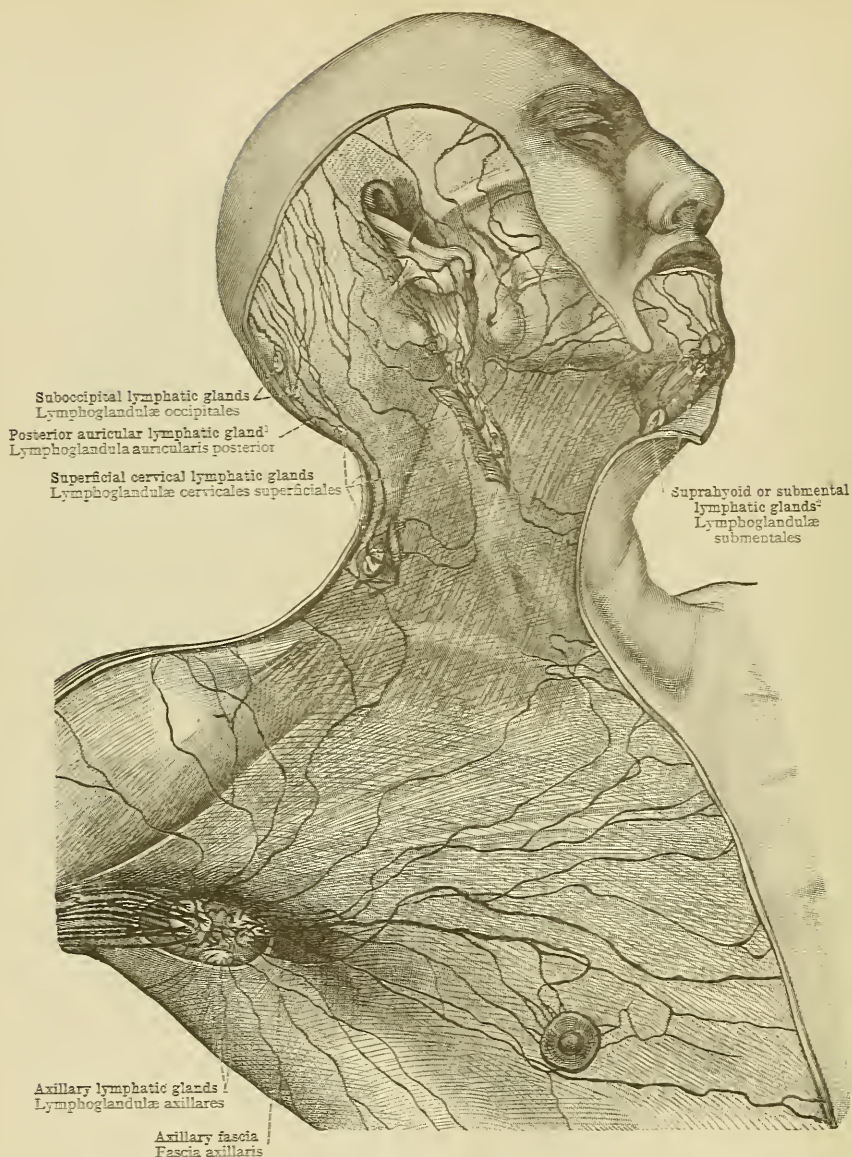


FIG. III4.—THE LACTEALS AND THE MESENTERIC LYMPHATIC GLANDS, DEMONSTRATED IN A LOOP OF SMALL INTESTINE BY INJECTION WITH METALLIC MERCURY.

Vasa chyliifera—Lacteals.—Lymphoglandulæ mesentericæ—Mesenteric lymphatic glands.

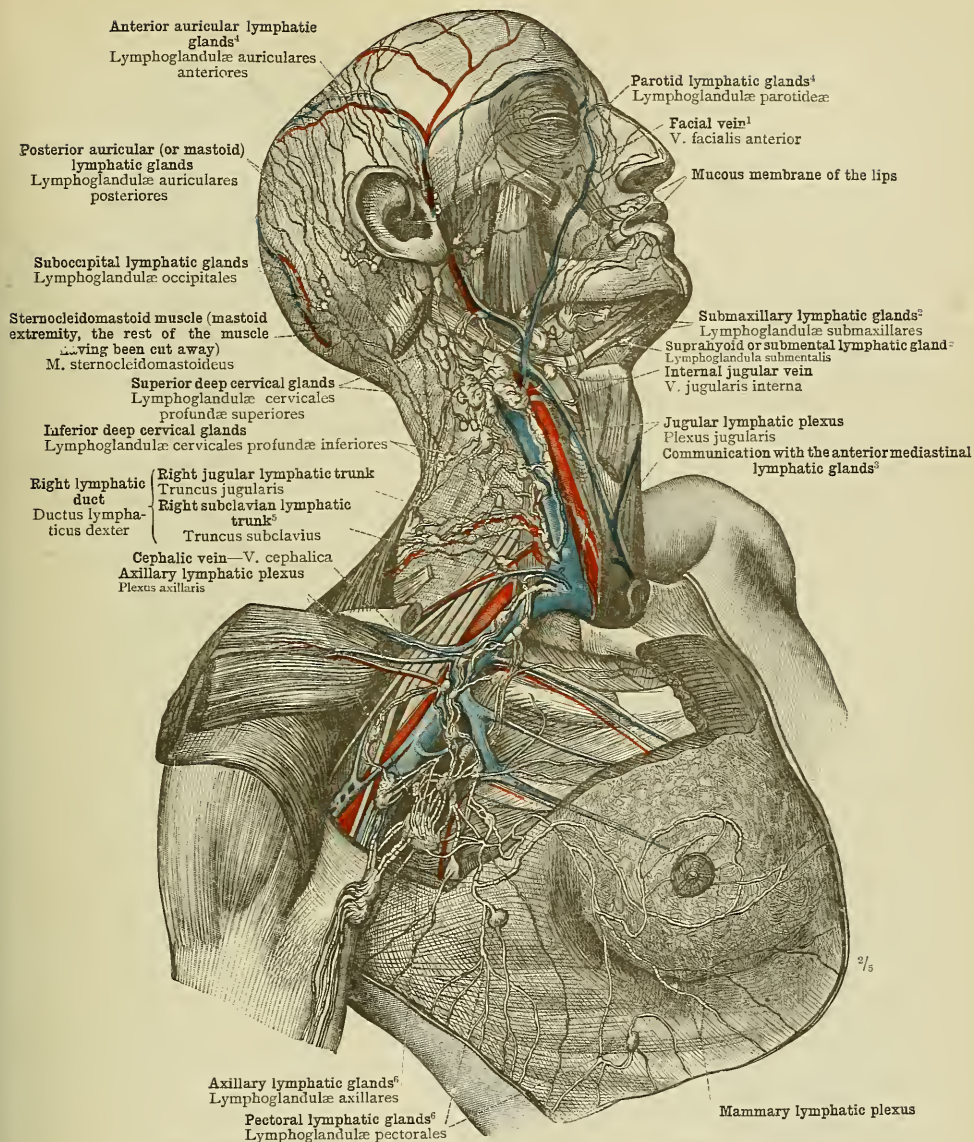


* This is one of the *matroid lymphatic glands* in Quain's nomenclature.

† See Appendix, note 245.

FIG. 1115.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE HEAD AND NECK, AND OF THE UPPER THORACIC AND THE HUMERAL REGIONS, WITH THE SUPERFICIAL LYMPHATIC GLANDS WITH WHICH THEY ARE CONNECTED.

Lymphatic Vessels of the Head, the Neck, and the Anterior Wall of the Thorax.



¹ Sometimes distinguished as the *anterior facial vein*. See Appendix, note 353.

² See Appendix, note 345.

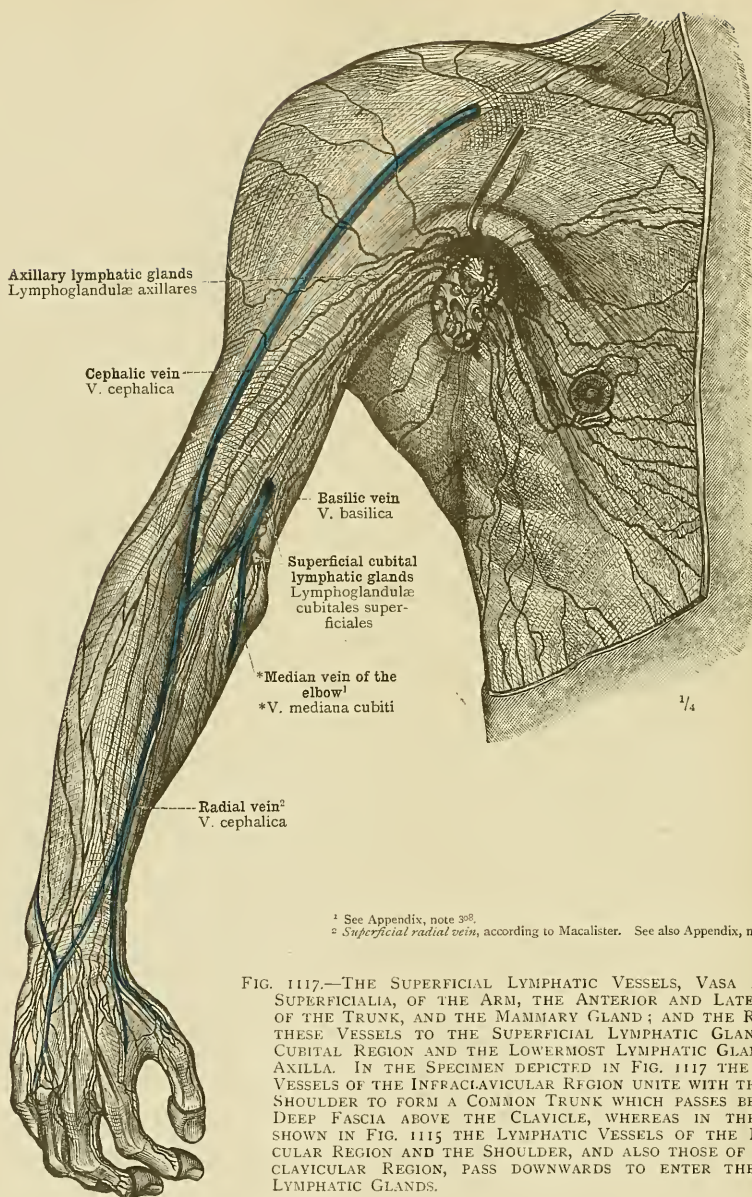
³ See Appendix, note 347.

⁴ According to Quain, the *right axillary lymphatic trunk*.

⁵ The *pectoral*, the *subscapular*, and the *infrascapular* lymphatic glands are described by Quain as subgroups of the *axillary lymphatic glands*.

⁶ See Appendix, note 345.

FIG. 1116.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE HEAD, AND THE DEEP LYMPHATIC VESSELS, VASA LYMPHATICA PROFUNDA, OF THE NECK AND THE AXILLA, WITH THE ASSOCIATED LYMPHATIC GLANDS; THE LYMPHATIC VESSELS OF THE FEMALE MAMMARY GLAND.

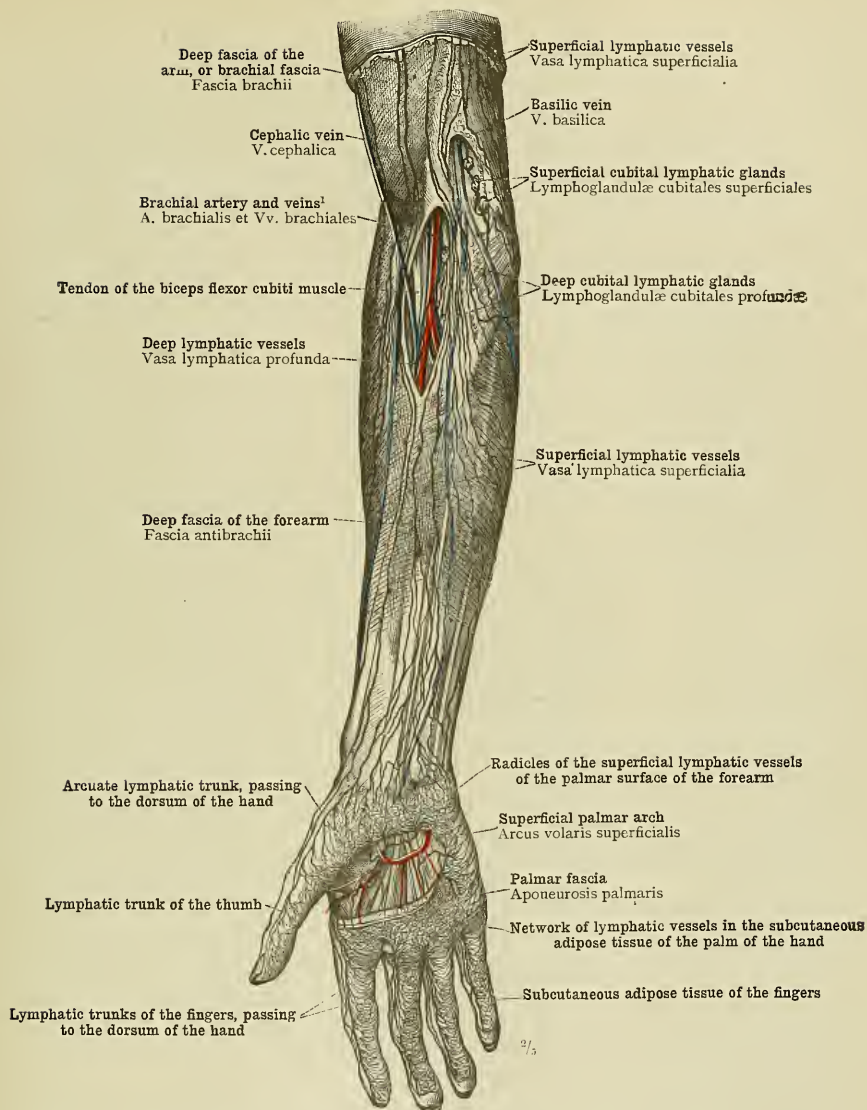


¹ See Appendix, note 3rd.

² Superficial radial vein, according to Macalister. See also Appendix, note 3rd.

FIG. 1117.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE ARM, THE ANTERIOR AND LATERAL WALLS OF THE TRUNK, AND THE MAMMARY GLAND; AND THE RELATION OF THESE VESSELS TO THE SUPERFICIAL LYMPHATIC GLANDS OF THE CUBITAL REGION AND THE LOWERMOST LYMPHATIC GLANDS OF THE AXILLA. IN THE SPECIMEN DEPICTED IN FIG. 1117 THE LYMPHATIC VESSELS OF THE INFRACLAVICULAR REGION UNITE WITH THOSE OF THE SHOULDER TO FORM A COMMON TRUNK WHICH PASSES BENEATH THE DEEP FASCIA ABOVE THE CLAVICLE, WHEREAS IN THE SPECIMEN SHOWN IN FIG. 1115 THE LYMPHATIC VESSELS OF THE INFRACLAVICULAR REGION AND THE SHOULDER, AND ALSO THOSE OF THE SUPRACLAVICULAR REGION, PASS DOWNWARDS TO ENTER THE AXILLARY LYMPHATIC GLANDS.

Lymphatic Vessels of the Upper Limb and the Anterior and Lateral Walls of the Trunk.



¹ Or *venæ comites* of the brachial artery.

FIG. IIII8.—LYMPHATIC VESSELS OF THE PALMAR SURFACE OF THE FOREARM AND HAND. IN THE FLEXURE OF THE ELBOW (ANTECUBITAL FOSSA), THE DEEP LYMPHATIC VESSELS AND GLANDS HAVE BEEN EXPOSED BY DIVISION OF THE DEEP FASCIA.

Lymphatic Vessels of the Upper Limb.

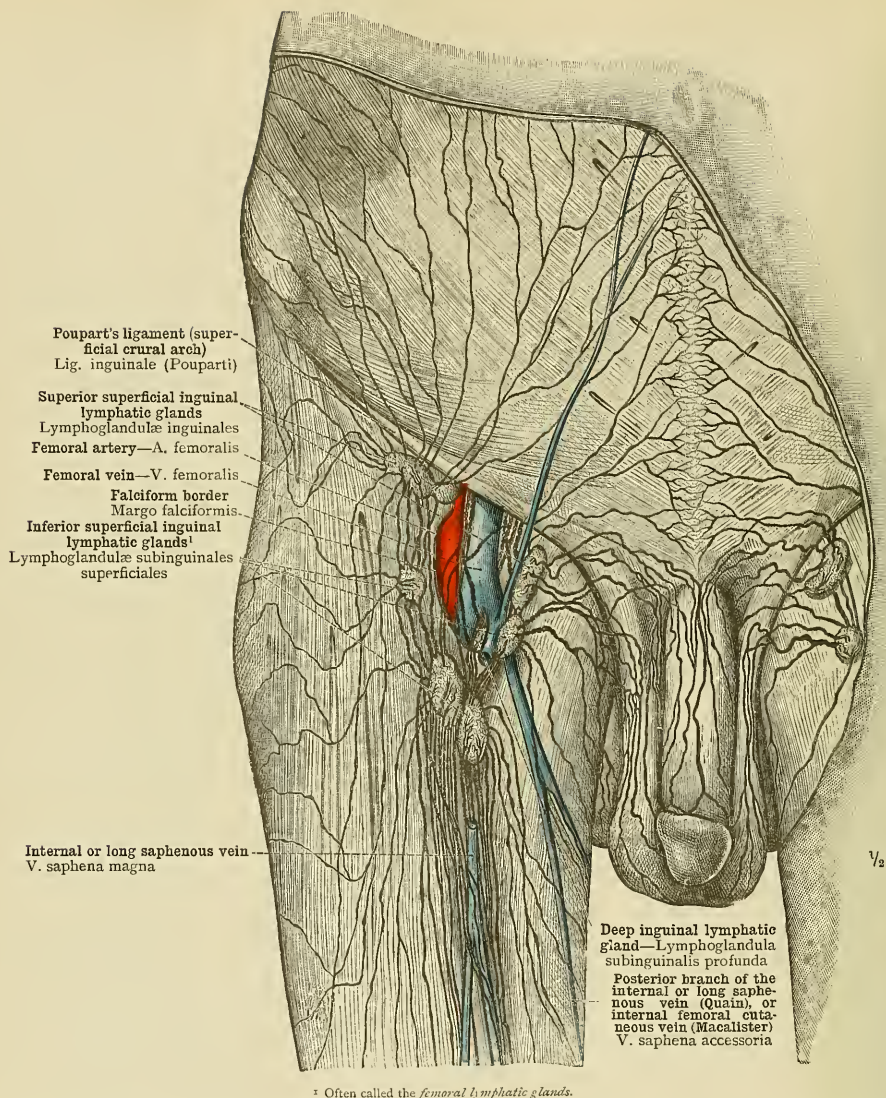


FIG. 1119.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE INGUINAL REGION, THE MALE EXTERNAL GENITAL ORGANS, AND THE ADJOINING PORTIONS OF THE THIGH AND ABDOMEN, WITH THE ASSOCIATED LYMPHATIC GLANDS; THE SUPERFICIAL INGUINAL LYMPHATIC PLEXUS.

The superior cornu of the falciform border and part of the internal or long saphenous vein were removed.

Superficial Lymphatic Vessels and Glands of the Inguinal Region and the Male External Genital Organs.

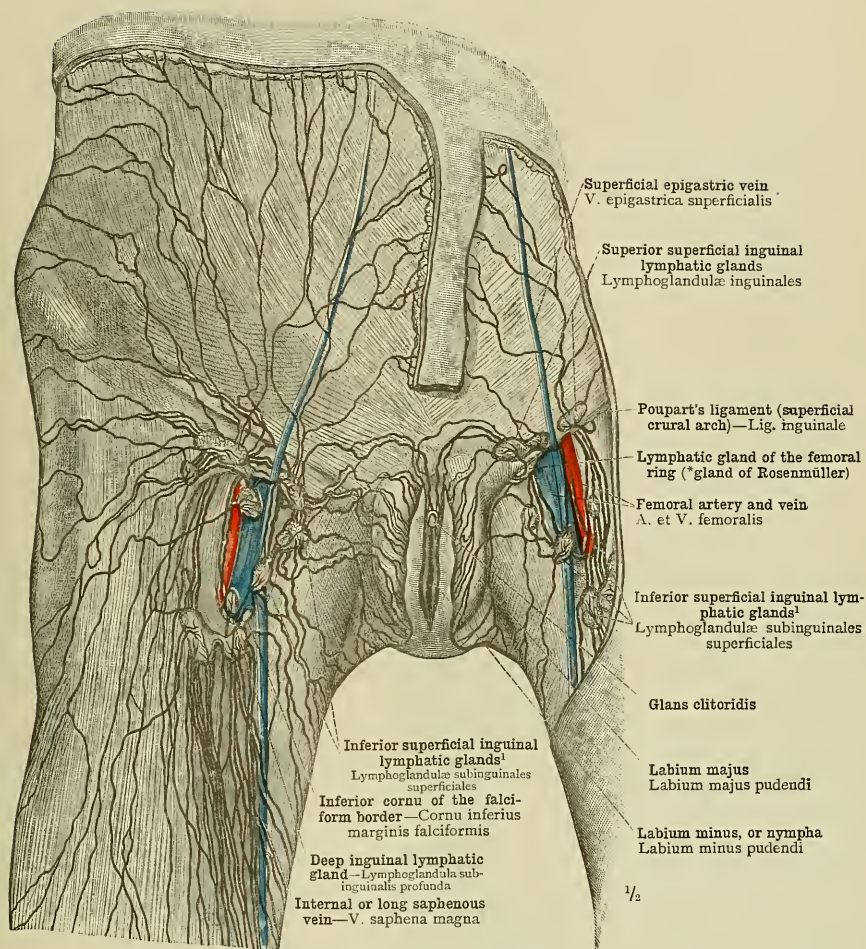
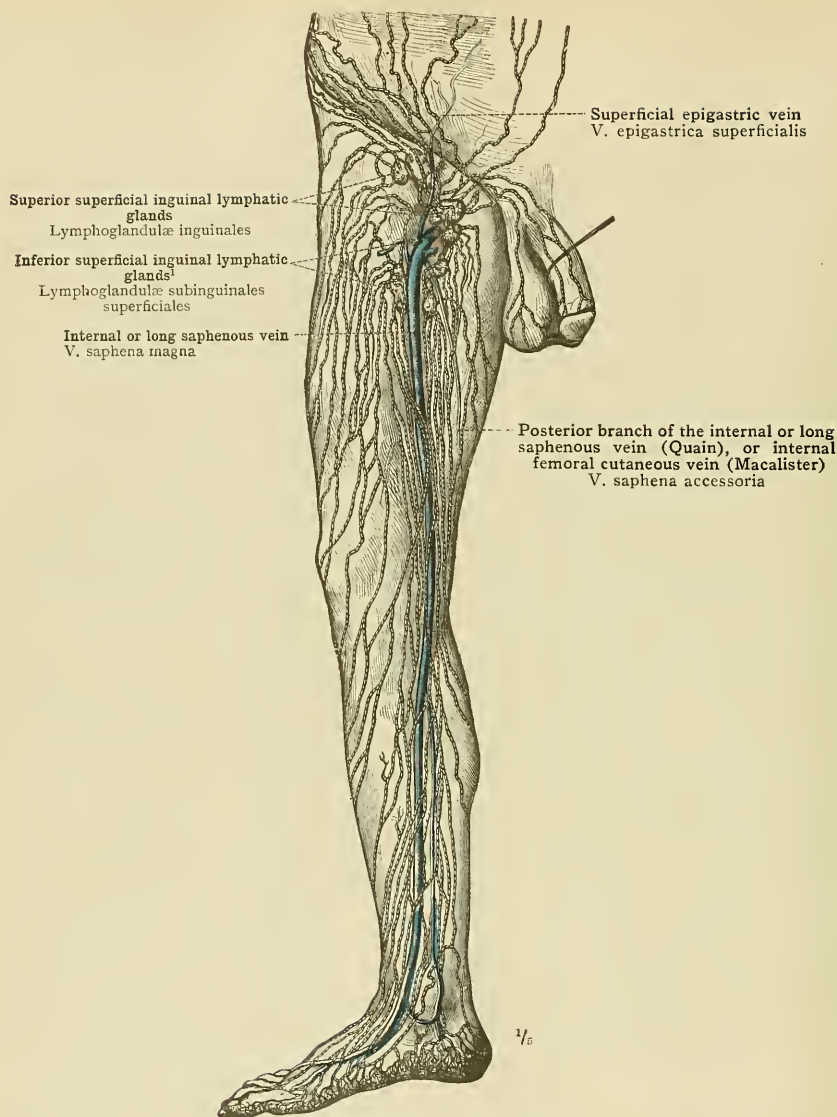


FIG. 1120.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE INGUINAL REGION, THE FEMALE EXTERNAL GENITAL ORGANS, AND THE ADJOINING PORTIONS OF THE THIGH AND ABDOMEN, WITH THE ASSOCIATED LYMPHATIC GLANDS.

Superficial Lymphatic Vessels and Glands of the Inguinal Region and the Female External Genital Organs.



* Often called the *femoral lymphatic glands*.

FIG. 1121.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE RIGHT LOWER LIMB, THE MALE EXTERNAL GENITAL ORGANS, AND THE ANTERIOR WALL OF THE ABDOMEN, WITH THE SUPERIOR SUPERFICIAL INGUINAL LYMPHATIC GLANDS, LYMPHOGLANDULÆ INGUINALES, AND THE INFERIOR SUPERFICIAL INGUINAL LYMPHATIC GLANDS (OFTEN CALLED THE FEMORAL LYMPHATIC GLANDS), LYMPHOGLANDULÆ SUBINGUINALES SUPERFICIALES. SEEN FROM BEFORE AND THE INNER SIDE.

The lymphatic vessels were injected with metallic mercury.

Lymphatic Vessels of the Lower Limb.

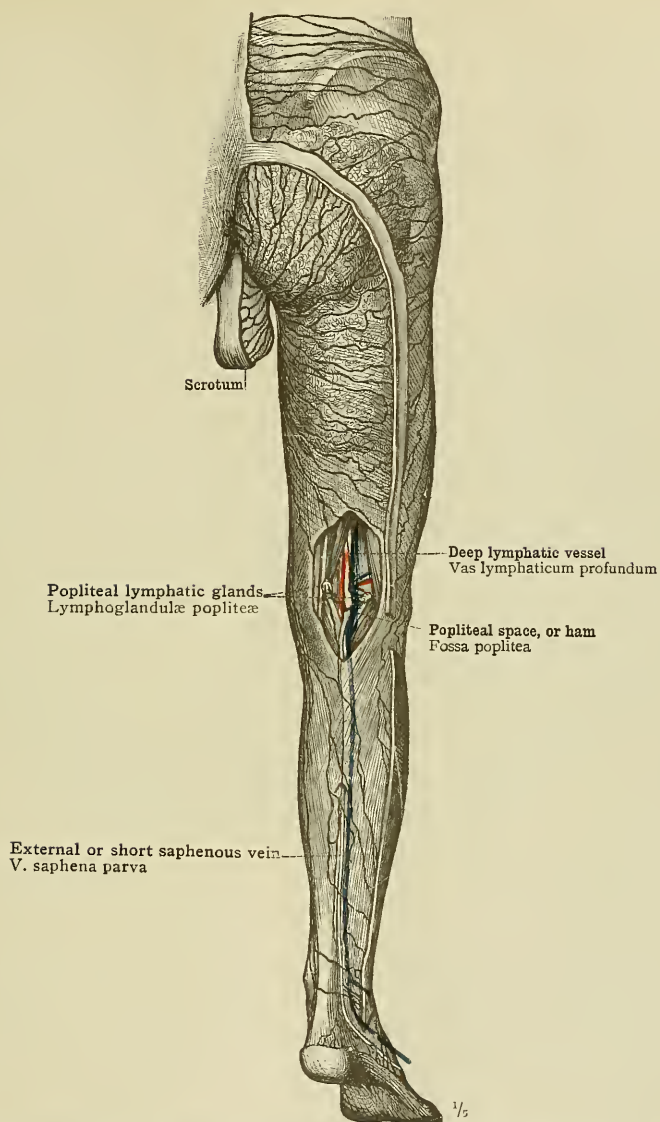


FIG. 1122.—THE SUPERFICIAL LYMPHATIC VESSELS VASA LYMPHATICA SUPERFICIALIA, OF THE BACK OF THE RIGHT LOWER LIMB, THE HIP AND THE SCROTUM. IN THE POPLITEAL SPACE, OR HAM, THE DEEP LYMPHATIC VESSELS AND GLANDS HAVE BEEN EXPOSED BY DIVISION OF THE DEEP FASCIA.

Lymphatic Vessels of the Lower Limb.

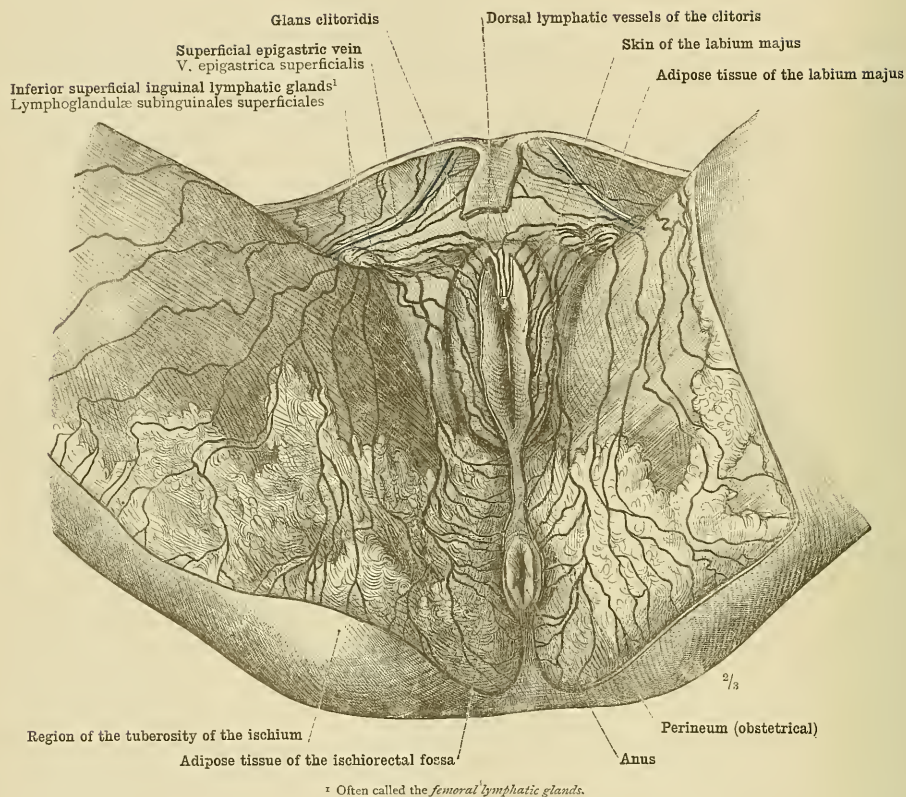


FIG. 1123.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE PERINEAL REGION AND THE FEMALE EXTERNAL GENITAL ORGANS.

In order to expose the dorsal lymphatic vessels of the clitoris (both in this specimen and in that depicted in Fig. 1120), the anterior commissure of the vulva was divided and the prepuce of the clitoris removed, so as to lay bare the body of that organ.

Superficial Lymphatic Vessels of the Perineal Region.

APPENDIX TO PART V.

NOTES BY TRANSLATOR

¹¹¹ (Fig. 944, p. 562.) The *ligamentum arteriosum* is a fibrous cord passing from the upper aspect of the right pulmonary artery, a little to the left of the bifurcation of the main trunk, upwards and backwards to the under side of the arch of the aorta. It is the remains of the obliterated *foetal ductus arteriosus*. These structures are sometimes called the *ligament* and *duct of Botallo* (*Botallus*).

¹¹² *Sinuses of Valsalva* (*Ibid.*).—The pulmonary artery, like the aorta, exhibits three bulgings at its root, opposite the three *semilunar* or *sigmoid* flaps of the valve guarding its ventricular orifice, known as the *sinuses of Valsalva*. The capacity of these sinuses is greater in the case of the aorta than in the case of the pulmonary artery, and it is the aortic sinuses that are as a rule denoted when the sinuses of Valsalva are spoken of without further qualification. Macalister, indeed, uses the name *sinuses of Valsalva* only in reference to the aorta, and terms the similar structures in the pulmonary artery the *pulmonary sinuses*. Young, on the other hand, in his "Synopsis of Human Anatomy" (U.S.), denotes by the term *sinuses of Valsalva* the *pulmonary sinuses* only, and states that "the *sinus aortici* correspond to the sinuses of Valsalva on the right side;" but this is opposed to the customary usage.

¹¹³ *Auricle and Atrium* (*Ibid.*).—The name *auricle* (*auricula*, little ear) was originally applied to what in England is now called the *auricular appendix*, which has a triangular pointed shape resembling that of the external ear of many mammals. The antechambers of the heart as a whole were called the *atria*. In Germany these terms are still used in their primitive signification; but in England the term *auricle* has, by metonymy, come to denote the antechamber as a whole, each *auricle* consisting of two parts: the *atrium* and the *auricular appendix*.

¹¹⁴ *Arteria Coronaria (Cordis) Dextra* (*Ibid.*).—The word *cordis* is added to distinguish the coronary arteries of the heart from the coronary arteries of the lips and the stomach respectively. In the author's nomenclature, however, the distinction is superfluous, since the *coronary arteries of the lips* are by him named *arteria labiales*; and the *coronary artery of the stomach*, *arteria gastrica sinistra*. Usually, moreover, the context is sufficient guide, and the qualification unnecessary. The branches of the *right coronary artery* seen in this figure are the smaller *infradivicular* branch, which ramifies over the *conus arteriosus* of the right ventricle; and the larger *marginal* branch, which runs down the right border to the apex of the heart. (Macalister calls these the *pre-ventricular* and *right marginal* arteries, respectively.) The *smallest cardiac veins* correspond to the former branch, the *anterior cardiac veins* to the latter. The termination of the *right coronary artery* in *transverse* and *descending* branches is seen in the next figure.

¹¹⁵ *Sinus Venosus and Sulcus Terminalis* (Fig. 945, p. 563).—Quain ("Anatomy," 10th ed., vol. ii., part ii., pp. 356 and 357) writes: "The main part of the auricle, that into which the great veins directly pour their blood, is commonly named *sinus*

venosus, or *atrium*, to distinguish it from the auricular appendix. At the outer and posterior part of the atrium is a slight groove, the *sulcus terminalis* of His, which runs from the front of the termination of the superior to the right of the inferior vena cava, and marks off the portion of the atrium formed by the dilated end of the venous trunks (*sacculus reunions* of the embryo) from that belonging to the primitive auricle." While Quain thus identifies the *sinus venosus* with the main cavity of the right auricle, Toldt denotes by the *sinus venarum (cavarum)* only that portion of the cavity lying to the left of the *sulcus terminalis*; the meaning of the English equivalent, *sinus venosus*, should be similarly restricted, as it then denotes that portion of the cavity of the auricle corresponding to the *sacculus reunions* of the embryo.

¹¹⁶ (*Ibid.*) The *right coronary artery* is here seen dividing into its terminal *transverse* and *descending* branches. The latter is called by Macalister the *posterior interventricular artery*. For the earlier branches of the right coronary artery, see above, note ¹¹⁴.

¹¹⁷ (*Ibid.*) The *oblique vein of Marshall* runs from the *vestigial fold (plica vena cava sinistra)*—see Fig. 974, p. 584—over the back of the left auricle to join the coronary sinus. It has no valve over its orifice; and the vein, together with the coronary sinus, is regarded as the *vestige* of the left superior vena cava of the *fœtus* (see note ¹²² below).

¹¹⁸ **Corona Cordis* (*Ibid.*).—The author describes the heart as divided by the *auriculoventricular groove* into two parts: the *Herzkrone (corona cordis)*, consisting of the two auricles with the intrapericardial portions of the great vessels; and the *Herzkegel* ("cone of the heart"—no Latin equivalent is given), consisting of the two ventricles. No English equivalent for these terms is used by Quain or Macalister, the *base of the heart* being not a portion, but one of the surfaces of the organ.

¹¹⁹ **Umbilical Ring* (Fig. 970, p. 580).—"The small aperture in the anterior abdominal wall by means of which the umbilical vessels pass into the umbilical cord, *annulus umbilicalis*, closes during the days immediately following birth" (Von Langer and Toldt, *op. cit.*, p. 406). In England the term *umbilical ring* is seldom employed, the term *umbilicus* denoting that structure as well as the *navel proper*, the permanent remnant of the umbilical cicatrization. The author's terminology, however, is more accurate.

¹²⁰ *Hyphogastric Artery* (*Ibid.*).—In England this term denotes the intra-abdominal portion of the umbilical artery of the *fœtus*, which undergoes obliteration after the cessation of the placental circulation, and is represented in the adult by a fibrous cord. The author's *arteria hyphogastrica* and *vena hyphogastrica*, on the other hand, denote the *internal iliac artery* and *vein* of English anatomists.

¹²¹ *Bulbus Venæ Jugularis* (Fig. 972, p. 582).—The author recognises two *bulbs* of the internal jugular vein, a *superior* and an *inferior*. English anatomists, when speaking of the *bulb* or *sinus of the internal jugular vein*, denote the *bulbus superior* of Toldt, only. This dilatation occupies the large posterior compartment of the

jugal foramen (see Fig. 1080, p. 685). According to Langer, however, the bulb does not belong to the internal jugular vein, but is to be regarded as the convexity of a sharp bend formed by the lateral sinus before it terminates in the vein. The *bulbus vena jugularis inferior* of Toldt is the dilated inferior extremity of the internal jugular vein, just above its junction with the subclavian vein.

¹²² *Plica Vena Cave Sinistra* (Fig. 974, p. 584).—This is a fold of pericardium, called by Marshall the *vestigial fold*, lying between the left pulmonary artery and the subjacent pulmonary vein. It encloses a vestige of the left superior vena cava (*duct of Cuvier*) of the fœtus in the form of a strand of fibrous tissue. From its inferior extremity the *oblique vein* of Marshall runs across the back of the left auricle to open into the coronary sinus. See note ¹¹⁷ above.

¹²³ **Jugular Venous Arch* (Ibid.).—This term is not used by Quain or Macalister. It is applied by the author to the communicating branch in the *suprasternal space* (Burns's space) between the two anterior jugular veins, and to those portions of the anterior jugular veins below the communicating branch which run outwards on each side behind the origin of the sternocleidomastoid muscle to open into the lower end of the *external jugular vein*. A transverse venous arch is thus formed at the root of the neck between the *external jugular veins*.

¹²⁴ (Fig. 975, p. 585).—In the normal development of the great veins, it is this communicating branch, often called the *transverse jugular vein*, which forms the greater part of the definitive left innominate vein.

¹²⁵ *Angulus Venosus* (Ibid.).—The name **venous angle, right, and left*, is given by the author to the junction on the respective sides of the neck of the internal jugular and subclavian veins, normally to form the innominate veins; in the specimen shown in Fig. 975, however, to form the superior vena cava (right and left).

¹²⁶ *Lumbar Arteries* (Fig. 981, p. 592).—These are usually five in number on each side, of which the upper four regularly arise from the aorta, and sometimes the fifth also; but quite often this artery, *arteria lumbalis ima*—the *lowest lumbar artery*—is, as in the present specimen, a branch of the *middle sacral artery*, or *sacral aorta*.

¹²⁷ (Ibid.) The *middle sacral artery* represents the caudal prolongation of the aorta met with in lower mammals, and its lateral branches are homologous with the intercostal and lumbar arteries; hence the name *sacral aorta*, used by Macalister. According to the terminology of this author (*op. cit.*, p. 428), "At the sacrococcygeal joint the artery becomes *middle coccygeal* or *caudal*, and is continued downwards to the tip of the coccyx, where its terminal branch passes outwards to end in the coccygeal glomerulus." In Toldt's nomenclature, however, as in that of Quain, the *middle sacral artery* (*arteria sacralis media*) retains its name unchanged up to its termination in the *coccygeal gland* or *glomerulus* (*glomus coccygeum*). This structure is shown in Fig. 926, p. 534, Part IV.

¹²⁸ *Sinus Maximus Aortæ* (Ibid.).—The space between the dotted lines pointing to the *ascending aorta* and the *arch of the aorta* in Fig. 981 is occupied by the *great sinus of the aorta*, which is not mentioned by the author. The aorta is first of a trefoil shape, owing to the presence of the *sinuses of Valsalva*, then becomes circular, then elliptical, the upper part of the ascending aorta and the commencement of the arch being dilated to form the *great sinus*, the long axis of whose ellipse is directed backwards and to the left. The dilatation varies in size in different bodies, is usually better marked in elderly persons, and

occasionally is not to be detected. Before the *aortic isthmus*, the lumen of the tube again becomes circular. See also Fig. 951, p. 569.

¹²⁹ *Spermatic Artery* (Ibid.).—This artery is called by the author *arteria spermatica interna*, to distinguish it from the *arteria spermatica externa*—the *cremasteric artery* of English anatomists.

¹³⁰ *Arteria Hepatica Propria* (Fig. 983, p. 594).—According to the author's nomenclature, the hepatic artery breaks up into a descending division, *arteria gastroduodenalis*, and an ascending division, *arteria hepatica propria*. The latter gives off the *arteria gastrica dextra* (pyloric artery), and then breaks up into a *ramus sinister* and *ramus dexter* (the left and right hepatic arteries). The term *arteria hepatica propria* has no English equivalent, the artery, from its origin from the celiac axis to its division into right and left hepatic arteries, being called simply the *hepatic artery*.

¹³¹ *Pyloric Artery* (Ibid.).—This, the *arteria gastrica dextra* of the author, is called by Macalister the *superior pyloric artery*, to distinguish it from a small branch, usually unnamed, of the *gastroduodenal artery*, but called by him the *inferior pyloric artery*.

¹³² *Ramus Costalis Lateralis* (Fig. 988, p. 599).—"Among the branches of the internal mammary artery, a not unimportant and somewhat common variety is the existence of the *ramus costalis lateralis*; this arises just above the first rib from the internal mammary trunk, runs obliquely downwards and backwards on the inner surface of the wall of the thorax as far as the fifth or sixth rib, and gives offsets in the intercostal spaces which anastomose with branches of the intercostal arteries" (Von Langer and Toldt's "Anatomy," p. 513). Quain (*op. cit.*, vol. ii., p. 429) calls this the *lateral branch of the internal mammary artery*, and states that when present it runs "about midway between the spine and sternum, or somewhat further forward." Macalister calls it the *lateral infraclavicular branch*, and remarks: "The existence of this vessel must be remembered in paracentesis. I have seen it of enormous size in cases of obliteration of the dorsal aorta from the pressure of an intrathoracic tumour" ("Anatomy," p. 554).

¹³³ *Inner Mammary Branches* (Ibid.).—"The perforating branches (of the internal mammary artery) of the third, fourth, and fifth spaces in the female give *rami mammarii* to the breast" (Von Langer and Toldt, *op. cit.*, p. 513). In Fig. 988, it is the *anterior perforating branch of the second right space* that furnishes the largest of these mammary branches.

¹³⁴ (Ibid.) The *origin of the branches of the subclavian artery* is so variable that it is difficult to decide which arrangement is to be regarded as normal. Von Langer and Toldt describe the *thyroid axis* as supplying four branches: the *inferior thyroid*, the *ascending cervical*, the *superficial cervical*, and the *suprascapular*. Quain states that the *thyroid axis* divides into "the *inferior* or *ascending thyroid*, the *suprascapular*, and a third branch, which is either the *transverse cervical*, or one of the branches into which that artery, when present, divides—viz., the *superficial cervical*" (the other being the *posterior scapular*). Here, however, we see a trunk, called by Toldt the *superficial cervical*, dividing into the *transverse cervical* and (presumably) the *posterior scapular*. Macalister uses the name *posterior scapular* as synonymous with *transverse cervical*, and regards the common origin of the *superficial cervical* and the *posterior scapular* as one of the most frequent arrangements. (See also note ¹³⁵ below.)

¹³⁵ (Ibid.) According to Quain's nomenclature, this trunk would be called the *transverse cervical*, while of the two branches into which it divides, the lower, called here *transversa colli*, is the *superficial cervical*, the upper, apparently, the *posterior scapular*. (See also note ¹³⁴ above and notes ¹³² and ²⁰⁸ below.)

¹³⁶ (Ibid.) According to the usual English nomenclature, this

artery is still known as the *subscapular* after the *dorsal scapular* branch has been given off. Macalister, however, follows the Continental usage in calling it the *thoracicodorsalis* artery. (See note 205 below.)

¹³⁷ *Outer Mammary Branches* (Ibid.).—Those shown here are the *anterior divisions of the lateral cutaneous (pectoral) branches of the intercostal arteries*. (For the origin of these branches, see Fig. 978, p. 589.) Other *outer mammary branches* are normally supplied by the *long thoracic artery* (see Fig. 1017, p. 628), which for this reason is sometimes called the *external mammary artery*.

¹³⁸ *Scrotal and Labial (or Vulval) Arteries, Anterior and Posterior* (Ibid.).—As these names are not employed by Quain or Macalister, some explanation is required of the manner in which they are applied by the author. The *superficial or long perineal artery* (see notes 147 and 149 below) terminates by dividing in the anterior half of the perineum (in the triangular intermuscular space beneath Colles's fascia) by dividing into two long slender branches which proceed forwards as the *arteria scrotales posteriores*, in the male, to supply the posterior half of the scrotum, and as the *arteria labiales posteriores*, in the female, to supply the hinder part of the vulva. The *superior and inferior external pudic arteries* (called by Macalister *superior or superficial pudic* and *inferior pudic*, respectively) are distributed chiefly to the front of the scrotum, in the male, and of the vulva, in the female, by means of terminal branches, *arteria scrotales anteriores* and *arteria labiales anteriores*, respectively, which anastomose with the posterior scrotal and posterior labial (or vulval) arteries just described. The arteries are accompanied by veins similarly named by Toldt, the *posterior scrotal* (or *labial*) *veins* being tributaries of the *superficial or long perineal vein*; and the *anterior scrotal* (or *labial*) *veins* opening into the *external pudic veins*.

¹³⁹ *Internal Pudic Artery* (Fig. 989, p. 600).—This is called by Macalister the *pudic artery* without qualification, since the small branches of the epigastric artery commonly denominated *external pudic* are by him termed the *pudic arteries* (see note 138 above).

¹⁴⁰ *Pelvic Diaphragm* (Ibid.).—As used by English anatomists, this denotes the *levator ani* and the *coccygeus* or *levator coccygis* muscles; the author, however, includes under this designation, in addition to the muscles themselves, the *rectal fascia* covering their upper surface (*fascia diaphragmatis pelvis superior*) and the *anal fascia* covering their lower surface (*fascia diaphragmatis pelvis inferior*). See Part IV. of this work, Fig. 881, p. 513.

¹⁴¹ *Arteria Penis* (Ibid.).—The name of **artery of the penis* is given by the author to the distal portion of the *internal pudic artery* of English anatomists, after it has left the ischiorectal fossa, and before it bifurcates into the *artery of the corpus cavernosum* and the *dorsal artery of the penis*. The *artery of the bulb* is derived from this portion of the trunk.

¹⁴² *Diaphragma Urogenitale* (Ibid.).—The name of *urogenital diaphragm* is given by the author to the *triangular ligament of the urethra* of English anatomists, including the muscle contained between the two layers of that ligament—the *constrictor* or *compressor urethrae*. (See Appendix to Part IV. of this work, note 99.)

¹⁴³ *Inferior Vesical and Middle Hemorrhoidal Arteries* (Ibid.).—Quain gives *vesicoprostatic artery* as an alternative name for the *inferior vesical artery* in the male. A slender offset is seen in Fig. 989 passing to the rectum from the lower part of this vessel, and no other branch is shown in the figure representing the *middle hemorrhoidal* or *middle rectal artery*, which is, however, usually much larger, and may be derived either from the *inferior vesical* or from the *internal pudic artery*.

¹⁴⁴ *Inferior Vesical Artery* (Fig. 990, p. 601).—Quain gives *vesicoprostatic artery* as an alternative name for this artery in the male.

¹⁴⁵ *Alcock's Canal* (Ibid.).—In the ischiorectal fossa the *internal pudic artery* runs in a canal in the substance of the obturator fascia, known as *Alcock's canal*. In Fig. 990 this canal has been opened to show the artery, except for a distance of about a quarter of an inch in front. For the nomenclature of the *internal pudic artery*, see note 139 above.

¹⁴⁶ (Ibid.) Quain gives *external hamorrhoidal* as an alternative name for this artery; Macalister calls it the *anal artery*.

¹⁴⁷ *Arteria Perinei* (Ibid.).—English anatomists usually describe two *perineal branches of the internal pudic artery*: the *superficial or long perineal artery*, which arises near the front of the ischiorectal fossa, passes either superficial to or beneath the *transversus perinei* (superficialis) muscle, and runs forward in the triangular intermuscular space beneath Colles's fascia, to terminate in the *posterior scrotal* or *posterior labial* branches and anastomose with the *anterior scrotal* or *labial* offsets of the *external pudic branches* of the femoral artery (see note 138 above); and the *transverse perineal artery*, generally arising in common with the preceding, but sometimes a distinct branch, which runs inwards towards the central point of the perineum, and supplies the parts between the anus and the bulb of the urethra. Toldt calls these two branches indifferently the *arteria perinei*.

¹⁴⁸ *Ligamentum Umbilicale Laterale* (Ibid.).—After the cessation of the placental circulation at birth, the hypogastric artery becomes impervious from the side of the bladder up to the umbilicus, and is converted into a fibrous cord. In England this is usually spoken of as the *obliterated hypogastric artery*, but the author calls it the **external umbilical ligament* (in contradistinction to the **median umbilical ligament* or *urachus*). The fold of peritoneum which covers this structure as it runs along the posterior surface of the anterior abdominal wall is called by the author *plica umbilicalis lateralis*, the *external umbilical fold*; but in England it is more often known by the name of the *hypogastric fold*. See Fig. 635, p. 386, and Fig. 636, p. 387, in Part III. of this work.

¹⁴⁹ **Perineal Artery* (Fig. 991, p. 602).—The short trunk called by the author *arteria perinei* is seen to divide almost immediately into a posterior branch, the *transverse perineal artery*, and an anterior branch, the *superficial or long perineal artery*. See note 147 above.

¹⁵⁰ (Ibid.) Quain gives *external hamorrhoidal* as an alternative name for this artery; Macalister calls it the *anal artery*.

¹⁵¹ (Ibid.) The *superficial layer of the obturator fascia* where it covers the *internal pudic artery* has been removed throughout the whole length of *Alcock's canal*. See note 145 above.

¹⁵² *Urethral Artery* (Fig. 992, p. 603).—This may arise (as here) from the *artery of the bulb*, or separately from the trunk of the *internal pudic artery*.

¹⁵³ *M. Transversus Perinei Profundus* (Ibid.).—For the nomenclature of this muscle, see Appendix to Part IV., note 101.

¹⁵⁴ *Arteria Cruris Penis* (Ibid.).—In addition to the principal *artery of the corpus cavernosum* (*arteria profunda penis*), small offsets, usually two or three in number, pass to the crus from the trunk of the *internal pudic artery*, just behind its terminal bifurcation. These are left unnamed in most English works on anatomy, but may be called *arteries of the crus penis*.

¹⁵⁵ (Fig. 993, p. 604.) Just behind the *superficial or long perineal artery*, running transversely inwards to the space between the anus and the vaginal orifice (i.e., the *obstetrical perineum*) is the *transverse perineal artery* of English anatomists. (See note 147 above.)

¹⁵⁶ *Arteria Clitoridis* (Ibid.).—Just as, in the male, the *internal pudic artery* of English anatomists becomes, in the author's

nomenclature, the *artery of the penis* as soon as it leaves the ischioectal fossa (see note ¹⁴¹ above), so, in the female, it becomes the *artery of the clitoris*, which gives off the *artery of the bulb* (*arteria bulbi vestibuli*)—see Fig. 994, p. 605, and Fig. 996, p. 607 to the vaginal bulb or bulb of the vestibule, and terminates by dividing into the *artery of the corpus cavernosum of the clitoris* (*arteria profunda clitoridis*) and the *dorsal artery of the clitoris* (*arteria dorsalis clitoridis*).

¹³⁷ *Superficial or Long Perineal Artery* (Fig. 994, p. 605).—In the female, this artery is considerably larger than in the male, as will be seen by a comparison of Fig. 994, p. 605, with Fig. 991, p. 602. The foremost of the branches indicated by the author in Fig. 994 as *arteria hemorrhoidales inferiores* represents the *transverse perineal artery* of English anatomists—see notes ¹⁴⁷ and ¹⁴⁹ above.

¹³⁸ (Ibid.) Represented here by several twigs, instead of the single stem normally given to the anus by the internal pudic artery, and called by Macalister the *anal artery*. But see also the second sentence in note ¹³⁹ above.

¹³⁹ *Bulbus Vestibuli* (Ibid.).—Regarding the nomenclature of this structure, see Appendix to Part IV., note ⁹¹.

¹⁴⁰ *Vaginal Arteries* (Fig. 995, p. 606).—The arrangement of these in this specimen is worthy of note. The *uterine artery*, after crossing beneath the ureter and then running parallel with it for a considerable distance, gives off two branches which pass in front and behind the ureter, respectively, and then turn upwards to unite again into a considerable branch of the *internal pudic artery*. From the two arches thus formed, numerous small offsets are given to the vagina and the lower part of the bladder. For an account of the normal arrangement of the *vaginal arteries*, see note ¹⁶³ below.

¹⁴¹ (Ibid.) The *left ilio-lumbar artery* in this specimen is very much smaller than usual, and arises from the common iliac artery, instead of, as is normally the case, from the internal iliac prior to its breaking up into anterior and posterior divisions.

¹⁴² *Arteria Vesicales* (Ibid.).—The arteries called *vesical* in Fig. 995 are the terminal offsets merely, not the *vesical arteries* proper. No *superior vesical artery* is depicted in this specimen; and the *inferior vesical artery* (or *vesicovaginal artery*) is represented by the branch of the *internal pudic artery* which contributes to form the arterial arches mentioned in note ¹⁶⁰ above.

¹⁴³ *Vaginal Arteries* (Fig. 997, p. 608).—The upper part of the vagina (with the cervix uteri) is supplied by a special branch of the *uterine artery*, and it is this branch which in the left side of Fig. 997 is by the author denominated the *vaginal artery*. The lower part of the vagina is separately supplied. In the right side of Fig. 997 the author depicts *vaginal arteries* for this region arising from the *internal pudic artery*; in Fig. 995, p. 606, a somewhat similar arrangement is shown; while in Fig. 1074, p. 677, a larger branch for the lower part of the vagina arises in common with the *internal pudic*. According to Quain ("Anatomy," 10th ed., vol. ii., part ii., p. 474), "the *vaginal artery* (*vesicovaginal*) in the female corresponds to the *inferior vesical artery* (*vesicoprostatic*) in the male. Arising from the anterior division of the *internal iliac*, or frequently from the *uterine artery*, it descends and ramifies upon the vagina, sending at the same time offsets to the lower part of the bladder, to the bulb of the vestibule, and to the contiguous part of the rectum. It anastomoses behind the vagina with the corresponding artery of the opposite side." The fact is that the vagina is normally supplied with blood from both the sources mentioned, the branch from the *uterine* (which might be termed the *superior vaginal artery*) and the branch from the *inferior vesical artery* (which might be termed the *inferior vaginal artery*) varying inversely with one

another in size. In Fig. 997 is shown a slender vertically disposed artery occupying the median line of the posterior surface of the vagina; this is often much larger than in the specimen here figured, being supplied by offsets from both the *superior* and the *inferior vaginal arteries*, and is termed the *azygos artery of the vagina*. It is well shown in a plate by Hyrtl, reproduced as plate vi. of Hart and Barbour's "Gynecology," 3rd ed., 1886, facing p. 68.

¹⁶⁴ (Fig. 998, p. 610.) The *ophthalmic artery* terminates by dividing into the *frontal* and *nasal* branches. Macalister follows the Continental terminology in speaking of the latter as the *arteria dorsalis nasi*.

¹⁶⁵ *Angular Artery* (Ibid.).—The *facial artery* is described by English anatomists as terminating usually by division into the *lateral nasal* and *angular arteries*, the latter being the slender twig which inosculates at the inner side of the orbit with the *nasal branch* of the *ophthalmic artery*. Toldt, however, gives the name of *arteria angularis* to the *facial* as soon as it has given off the *coronary artery of the upper lip*, and the *lateral nasal artery* is not mentioned by him. The last-named artery in the present specimen is represented by two or three slender twigs seen ramifying on the side of the nose.

¹⁶⁶ *Facial Artery* (Ibid.).—Quain gives *external maxillary*, and Macalister *external mandibular*, as an alternative name for this artery; but it is so rarely in England called anything but the *facial artery* that I have not thought it necessary to mention these synonyms in the text. Conversely, the *internal maxillary* is sometimes, though rarely, spoken of as the *deep facial artery*.

¹⁶⁷ (Ibid.) The *hyoid branch* of the *lingual artery* usually runs along the upper border of the hyoid bone (in the figure, however, along the outer side of the great cornu), and is called by Macalister the *suprathyroid artery*.

¹⁶⁸ (Ibid.) Very often called the *temporal artery*, without qualification. It has, however, to be distinguished from the *anterior* and *posterior deep temporal branches* of the *internal maxillary artery*, and from its own *middle deep temporal* (*middle temporal*) branch.

¹⁶⁹ *Sternocleidomastoid Artery* (Ibid.).—This is described by Von Langer and Toldt as a special branch arising from the posterior side of the *external carotid artery* above the hyoid bone, and arching downwards and onwards to enter the inner side of the sternocleidomastoid muscle. It is described also by Macalister, but not by Quain. It varies inversely in size with the sternocleidomastoid branches of the *occipital* and *superior thyroid arteries*, and is sometimes absent.

¹⁷⁰ *Acromial Rete* (Ibid.).—This name is sometimes given to the arterial network formed on the upper surface of the acromion by anastomosing branches of the *acromi thoracic*, *suprascapular*, and *posterior circumflex arteries*. I may add that the word *rete* in this section of the "Atlas" is used without qualification only in speaking of *arterial retia*. The *venous retia* are always distinguished by the qualifying adjective.

¹⁷¹ *Arteria Labialis Inferior* (Fig. 999, p. 611).—Macalister describes the *inferior labial artery* as dividing into two branches: an upper, the *inferior coronary artery*, which runs near the free margin of the lower lip; and a lower, the *superficial mental artery*. Quain mentions the *inferior labial artery* and the *coronary artery of the lower lip* as being sometimes distinct branches of the *facial artery*, but sometimes arising in common from that artery.

¹⁷² *Arteria Transversa Colli* (Ibid.).—Fig. 999 shows what the author describes as the normal distribution of the branches of the subclavian artery, in which the *superficial cervical artery* arises from the *thyroid axis*, while the *transverse cervical artery*, arising

separately from the *subclavian trunk*, terminates by dividing into *ascending* and *descending branches*, the former running upwards among the muscles of the neck to anastomose with the *cervical* or *descending branch of the occipital artery* (see note ¹⁰, p. 611), the latter becoming the *posterior scapular artery*. In Macalister's terminology the *ramus ascendens* is called the *cervical branch of the transverse cervical* or *posterior scapular artery*. The artery in question (*ramus ascendens*) has no regular place in Quain's terminology, for that author describes a *transverse cervical artery from the thyroid axis*, dividing into *superficial cervical* and *posterior scapular arteries*, as the most usual arrangement. In his account of the *varieties*, however, of the branches of the subclavian artery, Quain states that "The transverse cervical branch of the thyroid axis not infrequently consists solely of the superficial cervical artery; and it often happens that the vessel derived from the thyroid axis is very small, and represents only in part the superficial cervical artery, a large vessel being given off from the second or third part of the subclavian, and dividing near the levator anguli scapulae into two branches, of which one ascends and represents the larger portion of the superficial cervical artery, while the other forms the posterior scapular" (*op. cit.*, vol. ii., p. 427). In this variety we have the arrangement described by Toldt as *normal*. See also notes ¹³⁴ and ¹³⁵ above and note ⁵ to p. 629.

¹⁷³ *Cricothyroid Artery* (Fig. 1000, p. 612).—Called by Macalister the *inferior laryngeal branch of the superior thyroid artery*. This artery is endangered in the operation of laryngotomy.

¹⁷⁴ *Superior Phrenic Arteries* (Ibid.).—Several branches to the upper surface of the diaphragm are supplied by the *internal mammary artery*. I. The *comes nervi phrenici* of English authors, called by Toldt *arteria pericardiophrenica*, shown here on both sides, accompanies the phrenic nerve, and supplies *pericardial* as well as *phrenic branches*. Quain gives *superior phrenic* as an alternative name for this artery. II. The *internal mammary* terminates by dividing into *superior epigastric* and *musculophrenic branches*, the latter giving off the three lowermost *anterior intercostal arteries* as well as supplying the diaphragm. III. On the right side of Fig. 1000, the author shows another branch supplied to the diaphragm by the *internal mammary artery*, and this he names *arteria phrenica superior*.

¹⁷⁵ *Thymic Artery* (Ibid.).—This small offset, which in the adult supplies the remains of the thymus gland, is one of the *anterior mediastinal branches of the internal mammary artery*.

¹⁷⁶ *Posterior Meningeal Artery* (Fig. 1001, p. 613).—This name is, in England, more often given to the *meningeal branch of the vertebral artery* (see Fig. 1003, p. 615, and Fig. 1007, p. 619) than to the *meningeal branch of the ascending pharyngeal artery*. The name is, however, equally applicable to both; and, in fact, the *ascending pharyngeal* usually supplies the dura mater with a larger vessel than that derived from the *vertebral artery*.

¹⁷⁷ *Costocervical Axis* (Ibid.).—This name for the trunk by which the *superior intercostal* and the *deep cervical arteries* usually arise in common from the second part of the subclavian artery is used by Macalister, but not by Quain.

¹⁷⁸ *Deep Branch of the Ascending Cervical Artery* (Fig. 1003, p. 615).—"A very variable offset of the *ascending cervical artery*, known as the "*ramus profundus*", passes backwards to the deep muscles of the back of the neck" (Von Langer and Toldt, *op. cit.*, p. 512). Neither Quain nor Macalister distinguishes this branch by name from the other muscular offsets of the *ascending cervical artery*.

¹⁷⁹ *Lachrymal Gland* (Fig. 1004, p. 616).—Regarding the distinction made by the author, and by some English anatomists

also, between the two portions of this gland, named respectively *superior* and *inferior lachrymal gland*, see note ¹ to p. 911 in Part VI. of this work.

¹⁸⁰ **Arteria Labialis Inferior* (Ibid.).—The upper of the two vessels denoted in Fig. 1004 by the name of *inferior labial artery* is called by Quain the *coronary artery of the lower lip*; and by Macalister, the *inferior coronary artery*. The lower of the two is itself the *inferior labial artery* in Quain's nomenclature, whilst Macalister calls it the *superficial mental artery*. See note ¹⁷¹ above.

¹⁸¹ *Rami Gingivales Superiores* (Fig. 1005, p. 617).—As is well shown in the figure, the *superior gingival branches* are offsets of an anastomotic arch lying below the malar process on the zygomatic and anterior or facial surfaces of the superior maxillary bone, this arch being formed behind by the *posterior (superior) dental (or alveolar) artery*, and in front by a branch of the *infra-orbital artery*.

¹⁸² *Ramus Tonsillaris* (Ibid.).—In this preparation (Figs. 1005 and 1006) and in the two next following (Figs. 1007 and 1008), the *inferior* or *ascending palatine artery* furnishes a *tonsillar branch*. Sometimes, however, this branch is wanting, and a separate *tonsillar artery* arises from the *facial trunk*.

¹⁸³ *Arteria Tympanica* (Ibid.).—Four *tympanic arteries* are described in Von Langer and Toldt's "Anatomy": The *anterior tympanic*, derived from the *deep auricular branch of the internal maxillary artery*; the *posterior tympanic*, a branch of the *stylo-mastoid artery*, which is itself derived from the *posterior auricular artery*; the *superior tympanic*, derived from the *middle or great meningeal artery*; and the *inferior tympanic*, derived from the *ascending pharyngeal artery*. By Quain these are termed the *tympanic branches* (without further qualification) of their respective trunks. The *petrosal* or *Fallopian branch of the middle or great meningeal* and the *tympanic branch* furnished by the *internal carotid artery* in the carotid canal also supply the tympanum. By their anastomoses the tympanic vessels form a vascular circle round the margin of the *membrana tympani*. The *anterior tympanic artery* is seen on p. 617, the *superior tympanic artery* on p. 621.

¹⁸⁴ *Arteria Ethmoidales et Arteriae Nasaes Anteriores Septi* (Fig. 1006, p. 618).—These small branches of the *ophthalmic artery* are variously named in England. *Internal nasal* is an occasional synonym for the *anterior ethmoidal artery*. Quain, in the section on *Angiology*, calls the *nasal branch of the anterior ethmoidal* the *anterior nasal artery*; in the section on the *Organs of the Senses*, however, the branches shown in Fig. 1006 ramifying on the septum are termed by him the *septal branches of the anterior and posterior ethmoidal arteries*.

¹⁸⁵ *Arteria Sphenopalatina* (Ibid.).—The *sphenopalatina* or *nasal artery*, a branch of the third (terminal) part of the *internal maxillary artery* in the *sphenomaxillary fossa* (its origin is shown in Figs. 1005 and 1007), enters the nasal fossae through the *sphenopalatine foramen*. The *pterygopalatine* or *pterygopharyngeal artery*, which passes backwards through the canal of the same name (*canalis pharyngeus*, according to Toldt) to supply the *foxnix of the pharynx* and the *sphenoidal sinus*, is often a branch of the *sphenopalatine artery*, but is sometimes separately derived from the *internal maxillary trunk*. Macalister further describes a *descending pharyngeal branch of the sphenopalatine artery*, but this is mentioned neither by Quain nor by Von Langer and Toldt. The *sphenopalatine artery* is distributed chiefly to the *nasal fossae*, its branches being called by Von Langer and Toldt *arteriae nasaes posteriores, laterales, et septi*, and by Macalister the *posterior nasal arteries*. "One long branch, the *nasopalatine artery* or *artery of the septum*, runs downwards and forwards in the groove on

the vomer, and ends in a small vessel which enters the incisor foramen to communicate with the descending palatine artery" (Quain, *op. cit.*, vol. ii., p. 406). According to Macalister's nomenclature, the *nasopalatine artery* divides into *superior* and *inferior* branches, the latter being that which passes through the incisor foramen. Von Langer and Toldt regard the *arteria nasopalatina* as the terminal branch of the *arteria palatina descendens*, which ascends through the incisor foramen (canal of Stensen) to anastomose with one of the *arteria nasales* previously mentioned (see note ¹³³ below). These are merely two different ways of regarding the same anatomical data.

¹³⁶ *Rami Dorsales Linguae* (Ibid.).—The *lingual artery* may supply a single *dorsal artery* of the tongue on either side, or (as here) several *dorsal lingual branches*.

¹³⁷ *Internal Carotid Artery* (Ibid.).—Two branches are given off from the second or intra-osseous portion of this vessel: (1) the *tympenic branch* (*ramus caroticotympanicus*), which passes through one of the *caroticotympanic canaliculi* and anastomoses with the other *tympenic arteries* (see note ¹³⁵ above); and (2) the *Vidian branch* (not shown in Fig. 1006), which anastomoses with the *Vidian branch* (*arteria canalis pterygoidei Vidiani*) of the internal maxillary artery.

¹³⁸ *Arteria Palatina Descendens*, **Arteria Palatina Major*, *et* **Arteria Palatina Minores* (Fig. 1007, p. 619).—The *superior* or *descending palatine artery*, arising in the sphenomaxillary fossa from the third (terminal) portion of the internal maxillary artery (see Fig. 1005, p. 617), sometimes gives off the *Vidian artery*, which may, however, arise separately from the internal maxillary trunk; it also gives small branches which descend in the posterior and external accessory palatine canals to supply the soft palate and the tonsil—these, called by Toldt *arteria palatina minores*, are left unnamed by Quain and Macalister, but may be termed the *accessory palatine arteries*; descending in the posterior palatine or palatomaxillary canal, the *superior* or *descending palatine artery* emerges on the inferior surface of the hard palate accompanied by the large palatine nerve, and runs forward in one of the *palatine grooves*; in this situation its name is unchanged in the English nomenclature; the author, however, now calls it **arteria palatina major*, the **great palatine artery*; the vessel terminates, as described in note ¹³⁵ above, by ascending through Stensen's canal to anastomose with the *nasopalatine artery* or *artery of the septum*.

¹³⁹ *Rami Gingivales Inferiores* (Ibid.).—The *inferior gingival branches* are derived partly from the *sublingual artery*, partly, also, from the *submental artery*, and from the *mylohyoid branch* of the *inferior dental* (or *alveolar*) artery.

¹⁴⁰ *Meningeal Branch of the Vertebral Artery* (Ibid.).—It is to this vessel that the name of *posterior meningeal artery* is commonly applied by English anatomists. The small vessel seen emerging from the jugular foramen, to which the name *arteria meningea posterior* is given by the author, is an offset of the *ascending pharyngeal artery*. (See also note ¹⁷⁶ above.)

¹⁴¹ **Arcus Raninus* (Fig. 1008, p. 620).—"Near the tip of the tongue the two *ranine arteries* communicate by means of a small loop (Krause), but with this exception the right and left arteries do not form other than capillary anastomoses" (Quain, *op. cit.*, vol. ii., p. 396).

¹⁴² *Rami Musculares Arteria Ophthalmica* (Fig. 1010, p. 621).—Some of these are named by English anatomists. Quain writes: "Small muscular offsets arise at uncertain intervals from the trunk of the *ophthalmic artery*, as well as from the *lacrimal* and *supra-orbital branches*; in addition to these there are two more regular branches, an *external*, which is distributed to the upper

and outer muscles of the orbit, and an *internal*, larger and more constant, to the lower and inner muscles" (*op. cit.*, p. 409). Macalister calls these branches *superior* and *inferior muscular*, respectively, and describes also a special *muscular artery* to the *external rectus*.

¹⁴³ *Ramus Orbitalis Arteria Meningea Media* (Var.) (Ibid.).—There is normally a small communicating branch, called by Quain the *orbital branch* of the *middle* or *great meningeal artery*, passing from the trunk of this vessel or from its anterior division through the outer end of the sphenoidal fissure (or through a special aperture in the great wing of the sphenoid bone) to join a branch of the *lacrimal artery*, and the *ramus orbitalis* here figured is a larger homologue of this vessel. Macalister names it the *lacrimal branch* of the *middle meningeal artery*, and in one place (*op. cit.*, p. 582) describes it as supplying the *lacrimal gland*; in another (p. 657), he states that the *lacrimal artery* (*ex arteria ophthalmica*) "receives a large branch through the sphenoidal fissure from the *middle meningeal artery*, this branch varying inversely in size with the *lacrimal artery* itself."

¹⁴⁴ *Arteria Tympanica Superior* (Ibid.).—Usually known in England by the name of the *tympenic branch* of the *middle* or *great meningeal artery*. (See note ¹³³ above.)

¹⁴⁵ *Arteria Cerebelli* (Fig. 1011, p. 622).—Some confusion is liable to arise regarding the nomenclature of the *cerebellar arteries*, and for this reason the use of double names is better avoided, and I adhere to those employed by Macalister. These vessels are three in number, two being offsets of the *basilar artery*, the third being derived from the vertebral: (1) *Arteria cerebelli inferior anterior*, the *anterior cerebellar artery* (Macalister); this arises from the posterior extremity of the *basilar artery*; Quain calls it the *anterior (inferior) cerebellar artery*, Ellis the *anterior cerebellar artery*. (2) *Arteria cerebelli superior*, the *superior cerebellar artery* (Macalister). This arises from the anterior extremity of the *basilar artery*, being commonly described as one of the terminal branches of that vessel; Quain and Ellis also call this the *superior cerebellar artery*. (3) *Arteria cerebelli inferior posterior*, the *posterior cerebellar artery* (Macalister); this arises from the vertebral artery; Quain calls it the (*posterior*) *inferior cerebellar artery*, Ellis the *inferior cerebellar artery*.

¹⁴⁶ *Operculum* (Fig. 1012, p. 623).—This name is given to the portions of the frontal and parietal lobes lying between the ascending and posterior branches of the fissure of Sylvius, and covering the upper part of the central lobe or Island of Reil. It is sometimes called more fully the *operculum of the insula*; sometimes, also, the *operculum of Burdach*.

¹⁴⁷ **Vena Mediana Colli* (Figs. 1015, 1016, p. 626).—"When both *anterior jugular veins* are absent, or very small, we find in the median line the **median vein of the neck*, the radicles of which are beneath the chin, and which runs in the superficial fascia towards the *suprasternal notch* (or *fossa jugularis*); in this region it usually bifurcates into right and left branches, which enter the **jugular venous arch* in the *spatium interaponeuroticum supra-sternale* [*suprasternal space*, or *Burns's space*—see note ¹²³ above], or the lower part of the *median vein of the neck* may itself form part of the **jugular venous arch*" (Von Langer and Toldt, *op. cit.*, p. 542). Quain states that the *anterior jugular vein* varies greatly in size, and that the right and left veins may sometimes be united into a single median vessel for a part of their length. Macalister uses the term *vena mediana colli* as a synonym for the *anterior jugular vein*.

¹⁴⁸ (Fig. 1015, p. 626).—Called by Macalister *nervus descendens cervicis*. This branch is, however, still very commonly known by the old name of *descendens noni*, the *hypoglossal nerve*, the *twelfth*

cranial nerve of Soemmerring, being the ninth cranial nerve, *nervus nonus*, in the enumeration of Willis.

¹⁹⁹ *N. Cervicalis Descendens* (Ibid.).—This name is given here, but not in the section on Neurology, nor in Von Langer and Toldt's "Anatomy," to one of the communicating branches of the cervical plexus which join the descending cervical branch of the hypoglossal nerve (see note ¹⁹⁸ above) to form the *ansa hypoglossi*.

²⁰⁰ *Sinus Vertebralis Longitudinalis* (Ibid.).—"A double vertically disposed series of anastomoses also belongs to the internal vertebral venous plexuses. These are situated on the posterior surfaces of the bodies of the vertebrae, and connect the adjoining vertebral venous plexuses. Taken as a whole they constitute the so-called *longitudinal vertebral sinuses*, which extend as two parallel vascular chains on either side of the posterior common ligament right down to the coccyx" (Von Langer and Toldt, *op. cit.*, p. 540). Quain calls them the *anterior longitudinal spinal veins*; and this author describes also two *posterior longitudinal spinal veins*, between the dura mater and the posterior wall of the spinal canal. They are, however, "often much broken up in parts of their course." The term *longitudinal vertebral sinus* is not current in England, but Macalister, writing of the *internal vertebral venous plexuses*, remarks: "The whole system is extrathecal, but within the perosteum of the canal, and therefore on the same horizon as the system of cerebral sinuses" ("Anatomy," p. 260).

²⁰¹ *Vena Intervertebralis* (Fig. 1016, p. 626).—The *intervertebral veins*, in the author's terminology, are those that drain the blood from the vertebral venous plexuses through the intervertebral foramina, passing, according to the region in which they issue, to the vertebral veins, the posterior branches of the intercostal and lumbar veins, and the lateral sacral veins. See also note ¹⁹⁵ below.

²⁰² *Layers of the Deep Cervical Fascia* (Ibid.).—Macalister enumerates these as follows: (1) The *suprasternomastoid layer*; (2) the *substernomastoid layer*, which splits into two at the outer side of the great vessels of the neck, thus forming the *carotid sheath*, the posterior layer of this sheath being continuous with (3) the *post-pharyngeal fascia*, which passes from side to side across the median line behind the constrictors of the pharynx; (4) the *pretracheal fascia* passes from side to side from the front of the carotid sheath anterior to the trachea, and between this layer and the *suprasternomastoid* or *superficial layer* is *Burns's space* (see note ¹⁹⁷ above), while below the *pretracheal fascia* passes into the thorax to join the pericardium as *Godman's fascia*; (5) the deepest transverse layer is the *prevertebral fascia* posterior to the post-pharyngeal fascia, but not distinguished from it in Figs. 1015 and 1016.

²⁰³ *Subscapular Artery* (Fig. 1017, p. 628).—According to Quain's nomenclature, which is that usually accepted in England, the *subscapular artery* gives off a large *dorsal branch*, the *dorsal scapular artery*, *arteria dorsalis scapulae*; and its downward continuation, often smaller than the dorsal branch, still receives the name of *subscapular artery*. According to Toldt, however, the *arteria subscapularis*, after giving off the *arteria circumflexa scapulae* (i.e., the dorsal branch aforesaid), becomes the *arteria thoracodorsalis*; and Macalister uses a similar terminology, describing the long *subscapular artery* as dividing into *dorsalis scapulae* and *thoracodorsalis*. He distinguishes the main trunk as the long *subscapular*, because one or two short *subscapular branches* (*rami subscapulares* according to Toldt) are given off by the axillary artery directly to the *subscapularis* muscle.

²⁰⁴ (Ibid.) *Arteria thoracalis lateralis*, the long *thoracic artery*, supplies *rami mammarii*, *external mammary branches*, larger in the

female than in the male, and especially large during lactation. The long *thoracic* itself is sometimes called the *external mammary artery*.

²⁰⁵ *Parts of the Subclavian Artery* (Ibid.).—Von Langer and Toldt divide the subclavian artery into two parts only: the *thoracic* part extends from the commencement of the vessel to its emergence from the **scalene space* (see note ¹ to p. 277 in Part III. of this work); the *cervical* part, comprising the remainder of the artery, between the outer border of the *scalenus anticus* muscle and the lower border of the *subclavius* muscle, lies deep in the (greater) *supraclavicular fossa*. English authorities divide the vessel into three parts, *first*, *second*, and *third* (Macalister giving as alternative names, *pectoral*, *intermuscular*, and *cervical* stages). The *first* part, internal to the *scalenus anticus* muscle, and the *second* part, behind that muscle, thus correspond to the *thoracic* part of Von Langer and Toldt; while the *third* or *cervical* part of English authors is nearly identical with the *cervical* part of Von Langer and Toldt, the only difference being that by the former the *outer border of the first rib*, by the latter the *lower border of the subclavius muscle*, is regarded as marking the boundary between the *subclavian* and the *axillary artery*.

²⁰⁶ *Branches of the Axillary Artery* (Fig. 1018, p. 629).—These are somewhat variable in their number and distribution, and they are very variously named by different authorities. By Von Langer and Toldt they are arranged in four groups, distributed respectively to the *anterior*, the *posterior*, the *internal* and the *external wall of the axilla*. I. *Branches to the Anterior Wall of the Axilla*: 1. *Arteria thoraco-acromialis*, usually known in England as the *acromiothoracic artery*, sometimes called the *acromial thoracic*, and by Macalister termed the *thoraco-acromial artery*; the named offsets of this vessel are four in number: *ramus subclavius*, the *clavicular branch*; *ramus pectoralis*, the *pectoral* or *thoracic branch* (there may be two or more of these, and among them in females is often an *external mammary branch*); *ramus acromialis*, the *acromial branch*, to the *acromial rete* (see note ¹⁷⁰ above); and *ramus deltoideus*, the *descending or humeral branch*, which runs downwards beside the cephalic vein in the *deltoideopectoral groove* (see Part III., p. 282, Fig. 523.). 2. *Arteria thoracalis suprema*, the *superior* or *short thoracic artery*, described by Von Langer and Toldt as an "occasional" branch; this vessel is often derived from the *acromiothoracic artery*—an arrangement described by some anatomists as normal, the *acromiothoracic trunk* being then often called the *thoracic axis*, especially when the remaining *thoracic branch* (presently to be described), the long *thoracic artery*, has the same origin. II. *Branches to the Posterior Wall of the Axilla*: 3. *Arteria subscapularis*, the *subscapular artery*, called by Macalister the long *subscapular artery* (see note ²⁰⁰ above): the principal branch of this is the *arteria circumflexa scapulae*, the *dorsal branch* of the *subscapular artery*, *dorsalis scapulae*, or *dorsal scapular artery* of English authors, which passes backwards through the **internal axillary space* (see Part III., p. 312, Fig. 599, and note ¹ to same page) or *subscapular triangle* (Macalister) to reach the *infraspinous fossa*; the *dorsal scapular artery* gives to the *subscapular fossa* what are variously described as *ventral branches* (Quain), *deep subscapular branch* (Macalister), or *infrascapular offset* (Ellis), and among the terminal offsets of this branch (or these branches) are the *ventral nutrient artery of the scapula* and the *superior articular artery of the shoulder*; in addition, the *dorsalis scapulae* gives a *descending branch* (called by Young the *median branch*) which runs in the groove between the origins of the *teres minor* and *teres major* muscles to the inferior angle of the scapula: the continuation of the *subscapular artery* (commonly smaller than the *dorsal branch*) is renamed by Toldt *arteria thoracodorsalis*, and Macalister

follows the Continental usage in terming it the *thoracodorsalis artery*, but by most English anatomists it is still called *subscapular artery* in this part of its course; it terminates in *muscular branches* to the latissimus dorsi, serratus magnus, teres major, and teres minor muscles. III. *Branches to the Internal Wall of the Axilla*: 4. *Arteria thoracalis lateralis*, the long thoracic (or external mammary artery), which gives muscular branches to the serratus magnus, pectoralis major, and pectoralis minor muscle, and *yami mammarii*, external mammary branches (see note ²⁰⁴ above). IV. *Branches to the External Wall of the Axilla*: 5. *Arteria circumflexa humeri anterior*, the anterior circumflex artery (of the arm). 6. *Arteria circumflexa humeri posterior*, the posterior circumflex artery (of the arm), which runs backwards through the *external axillary space (see Part III., p. 312, Fig. 589, and note ¹ to same page) or quadrilateral space (Macalister), and gives numerous offshoots, named by Macalister as follows: *Ascending branch*, to the teres minor muscle; *descending branch*, to the long head of the triceps; *nutrient branch*, to the great tuberosity of the humerus; *posterior articular artery*, to the shoulder-joint; *acromial branch*, to the rete acromiale (see note ¹⁷⁰ above); and an anastomotic branch to the superior profunda branch of the brachial artery. Fifth Group. *Branches not enumerated by Von Langer and Toldt*: 7. The *axillary artery* to the lymphatic glands and fatty tissue of the axilla; this is a very variable branch, and may arise (a) direct from the axillary trunk, (b) from the long thoracic artery, (c) from the thoracic axis (acromiothoracic artery). 8. In females there is occasionally an independent external mammary artery, arising from the axillary trunk below the origin of the posterior circumflex artery. Sixth Group. 9. *Rami subscapulares*, the short subscapular arteries, must also be mentioned, usually two in number, small vessels passing backwards from the axillary trunk to the subscapularis muscle.

²⁰¹ *Parts of the Axillary Artery* (Ibid.).—By Von Langer and Toldt, as by English anatomists, the axillary artery is divided into three parts, but the limits of these parts are not exactly identical in the Continental and the English description. As already mentioned (see note ²⁰⁵ above), according to Von Langer and Toldt, the subclavian artery becomes the axillary at the lower border of the subclavius muscle, but according to English anatomists at the outer border of the first rib. It is obvious that the English boundary is more precise, inasmuch as the position of the subclavius muscle varies with the varying elevation of the shoulder. The first part of the axillary artery extends from its commencement to the upper border of the pectoralis minor muscle. The second part of the artery lies beneath (behind) the pectoralis minor muscle. The third part of the vessel extends from the lower border of the pectoralis minor muscle to the termination of the vessel. In this respect, again, there is a difference between the Continental and the English usage, for according to the former, the axillary artery becomes the brachial opposite the lower (outer) border of the pectoralis major muscle; but according to the latter, opposite the lower (outer) border of the teres major muscle. Thus, the third part of the axillary artery, as the term is understood in England, is nearly twice as long as the third part of the vessel as described by Von Langer and Toldt.

²⁰² *Arteria Cervicalis Superficialis* (Ibid.).—"The superficial cervical artery is distributed to the superficial structures of the (greater) supraclavicular fossa, to the trapezius, levator anguli scapulae, rhomboideus major, serratus posticus posterior, and splenius capitis muscles. Its size and the area it supplies are exceedingly variable; it may entirely replace the transverse cervical artery (*arteria transversa colli*), or, conversely, be entirely replaced by that vessel. Normally it is one of the principal branches of the

thyroid axis" (Von Langer and Toldt, *op. cit.*, p. 512). Quain's use of the term *superficial cervical artery* is explained in notes ¹²⁴, ¹²⁵, and ¹⁷² above.

²⁰⁹ *The Branches of the Brachial Artery* (Fig. 1019, p. 630).—1. *Arteria profunda brachii*, the superior profunda artery (of the arm), which gives the following offshoots: (a) *Ramus deltoideus*, the communicating branch (Macalister) or deltoid branch (Quain), which anastomoses beneath the deltoid muscle with branches of the posterior circumflex artery; (b) *arteria nutriticia humeri*, the nutritivus (Macalister) or medullary branch (Quain); (c) *arteria collateralis media*, the muscular branch to the inner head of the triceps muscle; (d) *arteria collateralis radialis* (regarded in England as the terminal portion of the superior profunda artery itself), the anterior terminal branch of which passes with the musculospiral nerve through the external intermuscular septum, and anastomoses with the radial recurrent artery, while the posterior terminal branch passes along the back of the external intermuscular septum, and ends in the rete olecrani, anastomosing there with the inferior profunda, anastomotica magna, posterior ulnar recurrent, and interosseous recurrent arteries. There are, further, (e) the muscular branch to the long head of the triceps muscle; (f) a cutaneous branch with the inner cutaneous branch of the musculospiral nerve. 2. *Arteria collateralis ulnaris superior*, the inferior profunda artery, which supplies the inner head of the triceps, and ends in the rete olecrani already described. 3. *Arteria collateralis ulnaris inferior*, the anastomotica branch (anastomotica magna), which runs in the inner bicipital furrow, perforates the internal intermuscular septum, and joins the rete olecrani; it gives an anterior branch which descends between the brachialis anticus and pronator radii teres muscles in front of the internal condyle to anastomose with the anterior ulnar recurrent artery. 4. In addition to the medullary or nutritivus branch of the superior profunda, there is another and larger vessel supplied to the humerus called the chief medullary artery, which usually arises in common with the upper muscular branch to the brachialis anticus muscle; the foramen for the chief medullary artery is just below the insertion of the coracobrachialis muscle, that for the nutrient branch of the superior profunda is higher up, near the top of the spiral groove. 5. Small muscular branches are furnished by the brachial artery during its course, and are stated by Macalister to be usually eight in number. 6. According to Macalister, a *vas aberrans*, arising close to or in common with the superior profunda artery, descending over the median nerve, supplying the biceps, and ending by joining the radial (or less commonly the ulnar) artery, is usually present, but often so small as to escape injection; other authorities speak of its presence as exceptional. When large it may replace and simulate the brachial artery, which then appears to be superficial to the median nerve. If moderately large, it may replace the ordinary origin of the radial artery (rarely that of the ulnar artery); we thus have the condition, often met with, called the high bifurcation of the brachial artery. "A very interesting variety in the origin of the branches of the brachial artery is that in which the superior profunda artery, the inferior profunda artery, and the anastomotica magna artery all arise by a common stem, from which the circumflex arteries and the subscapular artery are also derived. In such cases, the axillary artery, as it emerges from the axilla, is seen to divide into two trunks of equal size, one of which runs as far as the elbow without giving off any branches of importance, whilst the other supplies the structures of the shoulder and the upper arm. This condition resembles that normally met with in the distribution of the femoral artery" (Von Langer and Toldt, *op. cit.*, p. 516).

²¹⁰ *Upper Limit of the Brachial Artery* (Ibid.).—As already mentioned in note ²⁰⁷ above, according to Von Langer and Toldt the axillary artery becomes the brachial artery opposite the lower (outer) border of the pectoralis major; but according to English anatomists somewhat lower than this, opposite the lower (outer) border of the teres major muscle. The former definition is really a more accurate one, for the vessel is no longer in the axilla after it has emerged from behind the pectoralis major muscle. Macalister, indeed, goes further than this, remarking that the whole of the third stage of the axillary artery (so-called)—i.e., from the lower border of the pectoralis minor to the lower border of the teres major muscle—"belongs to the arm, not to the axilla, and should properly be described as part of the brachial artery" ("Anatomy," p. 269). The distinction is, of course, one of definition merely, and has no practical significance.

²¹¹ (Fig. 1020, p. 631.) Partly owing to the independent origin of the muscular branch to the internal or deep head of the triceps muscle, *arteria collateralis media*, the distribution of the branches of the superior profunda artery differs somewhat in this specimen from the description given in note ²⁰⁹ above (q.v.). Thus, the lower part of the superior profunda artery, called by the author *arteria collateralis radialis*, is seen to divide into two branches, the anterior terminal branch passing with the musculospiral nerve through the external intermuscular septum, and the posterior terminal branch passing to the back of the elbow to join in the formation of the rete olecrani. Higher up, a large muscular branch to the external head of the triceps is seen.

²¹² *Rete Articulare Cubiti, Rete Olecrani, or Arterial Network of the Elbow* (Ibid.).—The vessels taking part in the formation of this plexus have been enumerated in note ²⁰⁹ above.

²¹³ *Digital Arteries* (Fig. 1022, p. 633).—In England the palmar digital arteries are usually spoken of as the digital arteries without qualification, the dorsal digital arteries, which are very much smaller than the palmar, being often ignored, except in the case of the dorsal arteries of the thumb and of the index finger. Moreover, the distinction made by the author between the *arteriæ digitales volares communes*, the common palmar digital arteries (before their bifurcation), and the *arteriæ digitales volares propriæ*, the proper palmar digital arteries (after their bifurcation), fully expressed in Quain's nomenclature. The *arteriæ digitales volares propriæ* of Toldt are by Quain termed *digital arteries* without further qualification; and these are said to divide into two collateral branches for the respective fingers, the *arteriæ digitales volares propriæ* of Toldt.

²¹⁴ *Anterior Annular Ligament of the Wrist* (Ibid.).—I take this opportunity of supplying an omission from the translation of Part III. (already published). The anterior annular ligament of the wrist consists of two layers, a superficial and a deep, the ulnar artery lying between them. The superficial layer, called by Toldt *ligamentum carpi volare*, is homologous with the posterior annular ligament of the wrist (*ligamentum carpi dorsale* of Toldt), both structures being specialized portions of the superficial layer of the deep fascia of the forearm; this superficial layer is continued below into the palmar fascia. The deep layer, called by Toldt *ligamentum carpi transversum*, arches over the median nerve and the nine flexor tendons, forming the anterior wall of the canal of the carpus, and is a specialized band of the intermuscular septum between the palmaris longus and the flexor sublimis muscles. The distinction between these two layers of the anterior annular ligament is not clearly indicated in all English text-books, but it is emphasized by Macalister (*op. cit.*, p. 309). In the translation of Part III. of this work, pp. 322, 324, 332, 334, I have

rendered the terms *ligamentum carpi volare* and *ligamentum carpi transversum* indifferently as *anterior annular ligament of the wrist*.

²¹⁵ *Anterior Carpal Rete* (Fig. 1023, p. 634).—This arterial network lies beneath the lower edge of the pronator quadratus muscle, and in front of the carpus. It is supplied by the anterior radial carpal and anterior ulnar carpal arteries (a large communicating branch between these vessels constituting the anterior carpal arch); also by the anterior communicating or anterior terminal branch of the anterior interosseous artery, and by the recurrent or ascending branches of the deep palmar arch.

²¹⁶ *Superior Perforating Arteries* (Ibid.).—These small vessels, which pass through the proximal extremities of the intermetacarpal spaces, connecting the deep palmar arch with the posterior carpal rete (see note ²¹⁹ below), are distinguished as superior perforating from the inferior perforating arteries which pass through the distal extremities of the intermetacarpal spaces, connecting the dorsal interosseous arteries with the (palmar) digital arteries. The radial artery itself, as it passes into the palm of the hand between the heads of the first dorsal interosseous (or abductor indicis) muscle, thus represents the first superior perforating artery. This is well shown in Fig. 1024.

²¹⁷ *Arteria Collateralis Radialis* (Ibid.).—This name is given by the author to the lower part of the superior profunda artery (of the arm) of English authors, after it has given off the *arteria collateralis media*, the muscular branch to the inner head of the triceps muscle (see notes ²⁰⁹ and ²¹¹ above).

²¹⁸ (Ibid.). The large artery of the thumb and the radial artery of the index finger, the last branches furnished by the radial trunk before it turns inwards to form the deep palmar arch, are commonly known in England by their Latin names of *principes pollicis* and *radialis indicis* arteries.

²¹⁹ *Posterior Carpal Rete* (Fig. 1024, p. 635).—This arterial network lies beneath the extensor tendons on the back of the carpus. It is supplied by the posterior radial carpal and posterior ulnar carpal arteries (a large communicating branch between these vessels constituting the posterior carpal arch); also by the terminal offsets of the anterior and posterior interosseous arteries; while the superior perforating arteries (see note ²¹⁶ above) connect the posterior carpal rete with the deep palmar arch.

²²⁰ *Dorsal Interosseous Artery* (Ibid.).—The first dorsal interosseous artery, called by Macalister the metacarpal artery, a branch of the radial artery, often arises, as in this instance, in common with the posterior radial carpal branch; it runs in the back of the interval between the second and third metacarpal bones. The second and third dorsal interosseous arteries, arising from the posterior carpal arch, are distributed in the back of the third and fourth interosseous spaces. See also note ²²² below.

²²¹ *Superficial Veins seen in Fig. 1028* (p. 638).—The arrangement of the superficial veins in this specimen is not that usually described as normal, but it is a very common variation from the normal, which will be better understood from an examination of the middle specimen of Fig. 1090, p. 697, in which the same arrangement is met with. A description of the *median vein of the elbow is given in note ³⁰⁸ below. In Fig. 1028 the radial vein, having already given off the *median vein of the elbow, has become the cephalic vein (see note ³⁰⁵ below); but the ulnar vein has not yet become the basilic vein, as it has not yet been joined by the *median vein of the elbow. This ulnar vein has no doubt been formed by the confluence of anterior and posterior ulnar veins. In the author's terminology it is the vena basilica (see note ³⁰⁶ below). The vein (unnamed in the figure) lying just in front of the ulnar vein is most probably the median vein (of the forearm), which has inclined inwards to join the ulnar vein.

²²² (Fig. 1031, p. 639.) It will be noticed that the author numbers the *arteria metacarpea dorsales* according to the number of the interosseous space in which they lie. In Quain's nomenclature, however, the *arteria metacarpea dorsalis prima*, being very small, is ignored; and thus the first dorsal interosseous artery of Quain (metacarpal branch of the radial artery, according to Macalister) corresponds to the *arteria metacarpea dorsalis secunda* of the author. The Continental enumeration of these vessels is much to be preferred. See also note ²²⁰ above.

²²³ *Femoral Artery* (Fig. 1033, p. 641).—The portion of this vessel above the origin of the *profunda* is often distinguished as the common femoral, that below the origin of the *profunda* as the superficial femoral artery.

²²⁴ *Internal Circumflex Artery (of the Thigh)* (Ibid.).—According to Von Langer and Toldt's description (*op. cit.*, p. 525), the *arteria circumflexa femoris medialis* divides almost immediately after its origin from the *profunda* into a *ramus superficialis*, distributed to the muscles of Scarpa's space, and a much larger *ramus profundus*, which passes backwards between the pectineus and iliopsoas muscles above the small trochanter to the back of the neck of the femur and supplies the *ramus acetabuli* to the hip-joint. According to the description given by Quain, the *ramus superficialis* corresponds to unnamed muscular branches, while the *ramus profundus* is the continuation of the internal circumflex artery itself; arrived at the back of the femur it supplies an *arterial branch*, the author's *ramus acetabuli*, the development of which is inversely proportional to that of the *articular branch* of the obturator artery; the internal circumflex finally divides into *ascending* and *transverse branches*, the former following the tendon of the obturator externus muscle to the digital or trochanteric fossa, and the latter ending in the *crucial anastomosis* (see note ²²⁰ below).

²²⁵ *Rete Patellæ* (Ibid.).—The *patellar rete* is that portion of the *rete articulare genu*, the "*articular rete of the knee*," which lies immediately in front of the patella. The term *patellar rete* is used by Macalister to denote the whole of the articular network of the knee; but Toldt limits the application of *rete patellæ* as above defined, and the latter's usage is to be preferred, on the score of accuracy. For an account of the *articular rete of the knee* as a whole see note ²²⁷ below.

²²⁶ *Branches of the Femoral Artery in the Lower Part of Hunter's Canal* (Fig. 1034, p. 642).—The author's nomenclature of these differs from that usual in England. "The branches of the femoral artery for the region of the knee-joint often arise by a common trunk, the *arteria genu suprema*. This springs from the femoral artery just above the opening in the adductor magnus muscle, and runs down towards the capsule of the knee-joint in the substance of the vastus internus muscle near the common extensor tendon. It gives *rami musculares* to the vastus internus; a *ramus saphenus* which, descending beside the internal saphenus nerve, is distributed to the integument; and finally *rami articulares*, which contribute to the *rete articulare genu* [see note ²²⁷ below]. Often, however, the greater number of the *rami musculares* and the *ramus saphenus* are supplied by a separate branch of the femoral artery, which arises from that trunk somewhat higher up in Hunter's canal" (Von Langer and Toldt, *op. cit.*, pp. 526, 527). According to Quain's description, several *muscular branches* are supplied by the femoral artery in Hunter's canal, the lowest of which, constant, and of considerable size (sometimes derived from the upper part of the popliteal artery), passes outwards across the back of the femur, perforating the short head of the biceps and the external intermuscular septum, to end in the crureus muscle. The *anastomotic artery* arises from the femoral a little above the opening in the adductor magnus,

and divides almost immediately into two branches (which are in many cases derived separately from the femoral trunk). The *superficial branch* runs down with the internal saphenous nerve; the *deep branch* courses along the front of the tendon of the adductor magnus muscle to the internal condyle of the femur. It supplies *articular branches* to the *rete articulare genu*. From these descriptions it will be apparent that the *anastomotic artery* is identical with the author's *arteria genu suprema*, and the *superficial branch* of that vessel with the author's *ramus saphenus*.

²²⁷ **Rete Articulare Genu* (Ibid.).—The "*articular rete of the knee*" is an arterial network over the front and sides of the knee-joint. It consists of two layers: a *superficial*, with wide meshes and very minute constituent vessels, lying between the skin and the deep fascia; and a *deep*, with finer meshes and larger constituent vessels, actually in contact with the bones. The *patellar rete* is that portion of the network situate immediately in front of the patella, but the term is by English anatomists usually applied (inaccurately) to the network as a whole. The vessels supplying the rete are six in number, viz., the four lateral *articular branches* of the popliteal, the *anastomotic branch* of the femoral, and the *recurrent branch* of the anterior tibial artery.

²²⁸ *Hunter's Canal* (Ibid.).—It is to be noted that the author uses the term *Hunter's canal* in a sense different from that attached to it by English anatomists. We find the following description in Von Langer and Toldt's "Anatomy," 7th ed., p. 263: "The *fossa iliopectinea* (Scarpa's triangle) . . . passes below into a groove, bounded internally by the adductor muscles and externally by the vastus internus muscle, and extending downwards along the long axis of these muscles. Already at the upper part of the middle third of the thigh, this groove is roofed by the sartorius muscle, and in addition, from about the middle of the thigh downwards, it is covered by a strong tendinous membrane, which stretches across from the commencement of the tendon of the adductor magnus muscle to the vastus internus muscle. Thus the groove is converted into a closed canal, *canalis adductorius Hunteri* (Hunter's canal)." If this description leaves the point still undecided, the description of Fig. 1034 shows clearly that the fascial layer there figured covering the lower part of the femoral artery is the roof of Hunter's canal, the upper aperture of which is in the middle of the thigh. In England, however, the sartorius muscle is regarded as the roof of Hunter's canal, and that canal extends from the point at which the muscle comes to lie in front of the artery, i.e., the apex of Scarpa's triangle, to the opening in the adductor magnus muscle. And while it is true that the accessory fascial roof of Hunter's canal is thicker and stronger below than above the middle of the thigh, that fascial roof exists wherever the femoral artery is covered by the sartorius muscle, and the well-defined upper margin of the fascia shown in Fig. 1034 is the product of dissection.

²²⁹ *Gluteal Artery* (Fig. 1038, p. 646).—By English anatomists this vessel is described as dividing just after it emerges from the pelvis into a *superficial*, smaller, part, and a *deep*, larger, part; the latter, again, divides into *superior* and *inferior branches*. In Toldt's nomenclature the superficial part is called the *muscular branch* to the gluteus maximus muscle; whilst it is the continuation of the trunk of the *arteria glutea superior* which divides into a *ramus superior* and a *ramus inferior*.

²³⁰ *Trochanteric Rete and Crucial Anastomosis* (Ibid.).—The *anastomotic branch* of the sciatic artery (seen in Fig. 1038 running downwards and outwards along the lower border of the pyriformis muscle), the *ascending branch* of the first or *superior perforating artery*, the *transverse branch* of the *internal circumflex artery*, and

the *transverse branch of the external circumflex artery*, inosculate behind the great trochanter and in the digital fossa to form what is often called the *crucial anastomosis*. A lateral extension from this anastomosis, in the form of a network of fine vessels on the outer surface of the great trochanter, beneath the *gluteus maximus muscle*, constitutes the *trochanteric rete*.

²³¹ *Adductor Magnus Muscle* (Ibid.).—This is the posterior and inferior portion of the *adductor magnus muscle* as usually described by English anatomists, the anterior and superior portion of the same muscle being the *adductor minimus muscle* of Toldt. See note ² to p. 345 in Part III. of this work.

²³² *Sural Arteries* (Fig. 1040, p. 648).—The *external and internal sural branches of the popliteal artery* are sometimes designated the *inferior muscular branches* (the *superior muscular branches* of the same trunk supplying the lower parts of the *adductor magnus* and *hamstring muscles*). The name *sural* is, however, preferable, as being more distinctive. The *cutaneous arteries of the calf*, long slender vessels, shown in Figs. 1040 and 1044, may arise, as in the specimen here figured, from the *sural arteries*; frequently, however, they are independent branches of the *popliteal trunk*. They are often distinguished by the name of *superficial sural arteries*.

²³³ *Medullary or Nutritious Arteries of the Femur* (Fig. 1041, p. 649).—According to Von Langer and Toldt (*op. cit.*, pp. 525, 526) the *arteria nutriticia femoris superior* is usually a branch of the *arteria perforans prima*, and the *arteria nutriticia femoris inferior* (larger than the former) is usually a branch of the *arteria perforans tertia*. Quain, in the osteological section of his work, figures two arterial foramina in the shaft of the femur, near the upper and the lower end, respectively, of the *linea aspera*, but in the angiological section he omits to mention the offset of the *first or superior perforating artery*, which enters the upper of these two foramina. The *principal medullary artery of the femur* (*arteria nutriticia femoris inferior* of Toldt) is, according to Quain (*op. cit.*, vol. ii., part ii., p. 491), derived either from the *second (middle)* or from the *third (inferior) perforating artery*. An additional medullary artery is, according to this author, frequently derived from the *fourth perforating artery* (the *terminal branch of the deep femoral or profunda artery*). According to Macalister, the chief nutrient artery of the femur is usually derived from the *second or middle perforating artery*.

²³⁴ *Popliteal Canal* (Ibid.).—This name is not used by Quain or Macalister. It is applied by the author to the space beneath (anterior to) the tendinous arch of the *solcus muscle* through which the posterior tibial vessels and nerve pass from the popliteal space beneath the *soleus muscle*. See Fig. 612, p. 363, and Fig. 620, p. 371, in Part III. of this Atlas, and also note ²⁴⁵ below.

²³⁵ *External Tarsal Artery* (Fig. 1042, p. 650).—This name is used by Macalister. Quain, on the other hand, who leaves the small *internal tarsal arteries* unnamed, calls this vessel the *tarsal artery* without further qualification. The name used in the text is to be preferred.

²³⁶ *Malleolar Arteries* (Ibid.).—Both the *anterior external* and the *anterior internal malleolar arteries* are branches of the *anterior tibial artery*; the *posterior internal malleolar artery* is a branch of the *posterior tibial artery*; and the *posterior external malleolar artery* (an offset left unnamed by Quain) is derived from the *peroneal artery*.

²³⁷ *Retia Malleolaria* (Ibid.).—The *external and internal malleolar retia* are connected in front with the *dorsal rete of the foot* (see note ²³⁹ below), and behind and below with the *calcaneal rete* (see note ²⁴² below). The *external malleolar rete* is supplied by the two *external malleolar arteries* (*anterior and posterior*—see note ²³⁶ above), and by a branch of the *external tarsal artery*; the

internal malleolar rete is supplied by the two *internal malleolar arteries* (*anterior and posterior*—see note ²³⁶ above), and by branches of the *internal tarsal arteries*.

²³⁸ *Fundiform Ligament of Retzius* (Ibid.).—This name is given to the undivided outer limb of the anterior annular ligament of the ankle, or *ligamentum lamboideum* (see Fig. 614, p. 365, and Fig. 616, p. 367, and notes to same pages, in Part III. of this work).

²³⁹ *The Dorsal Rete of the Foot and the Dorsal Interosseous Arteries* (Fig. 1043, p. 651).—The arrangement of the bloodvessels of the dorsum of the foot described as normal by Von Langer and Toldt in their "Anatomy" differs in some respects from that shown in Fig. 1043, which is, however, normal according to English anatomists. The German authors write (*op. cit.*, p. 530): "The *arteria tarsae lateralis* [*external tarsal artery*—see note ²³⁵ above] combines with direct branches of the *arteria dorsalis pedis* and with offsets of the *arteria tarsae mediales* [*internal tarsal arteries*] to form the extensive *rete dorsale pedis*, from which numerous offsets to the tarsal bones are derived. From the anterior extremity of the *dorsal rete of the foot* three *arterie metatarsae dorsales* [II., IV., the second, third, and fourth *dorsal interosseous arteries*] proceed forwards. . . . These latter vessels are considerably reinforced by the *rami perforantes* [*posterior perforating arteries*] by means of which they are directly connected with the [*deep*] *plantar arch*; and in many instances the second, third, and fourth *dorsal interosseous arteries* are derived chiefly or exclusively from these *posterior perforating arteries*. In other cases, however, a vessel of considerable size arises from the outer side of the *dorsal artery of the foot*, known as the *arteria arcuata* [*metatarsal artery*], and arches forwards and outwards across the bases of the metatarsal bones to reach the outer border of the foot, receiving on the posterior or concave side of the arch numerous offsets from the *dorsal rete of the foot*, and supplying from the anterior or convex side of the arch the second, third, and fourth *dorsal interosseous arteries*. . . . The first *dorsal interosseous artery* is the direct continuation of the *dorsalis pedis artery*; and this vessel supplies not only the collateral *dorsal digital arteries* for the adjoining sides of the great and second toes, but also the *dorsal digital artery* for the inner side of the former."

²⁴⁰ *Termination of Dorsalis Pedis Artery* (Ibid.).—The *dorsal artery of the foot* terminates by dividing into two vessels of unequal size. The smaller terminal branch, which is continued in the same direction as the parent trunk, is the *first dorsal interosseous artery* in Quain's nomenclature, but Macalister calls it the *dorsalis hallucis*. (Regarding the distribution of this vessel see the end of note ²³⁹ above.) The larger terminal branch, usually known as the *communicating branch to the deep plantar arch*, passes between the heads of the first *dorsal interosseous muscle*, communicates with the *external plantar artery* to complete the *deep plantar arch*, and provides the *plantar digital vessels* for both sides of the great toe and for the inner side of the second toe; for this reason Quain gives the alternative name of *plantar digital branch* to this vessel. Inasmuch, however, as it is in series with the other posterior perforating arteries, and is serially homologous with the perforating portion of the radial artery in the upper limb, the name of *first posterior perforating artery* would be more accurately descriptive than any other. Macalister, to conclude, calls it the *first interosseous perforating artery*.

²⁴¹ *Perforating Arteries* (Ibid.).—According to the English nomenclature, there are two sets of these vessels—*anterior and posterior*. The latter, to which alone the name of *rami perforantes* is given by the author, larger in size and more constant than the former, are offsets of the *deep plantar arch*, and are described in

notes²³⁹ and²⁴⁰ above. The *anterior perforating arteries* are small and inconstant vessels connecting the anterior extremities of the *dorsal interosseous arteries* with the *plantar digital arteries* adjacent to the terminal bifurcation of these vessels. The author calls them *rami anastomotici arteriarum metatarsarum dorsalis cum arteriis digitalibus plantaribus*.

²⁴² *Calcaneal Rete* (Fig. 1044, p. 652).—The arterial network over the back and the under surface of the heel communicates above with the *external and internal malleolar retia* (see note²³⁷ above), and in front with the *plantar rete* (see note²⁴³ below). It is supplied by the *external* and the *internal calcaneal branches*, the former being derived from the *peroneal artery*, and the latter from the *posterior tibial artery* (Von Langer and Toldt), from the *external plantar artery* (Quain), or from both these vessels (Macalister).

²⁴³ *Plantar Rete* (Ibid.).—The fine-meshed arterial subcutaneous network over the sole of the foot communicates freely with the *calcaneal and malleolar retia* and with the *dorsal rete of the foot*, and in addition to the blood received from these sources is reinforced by numerous unnamed cutaneous offshoots of the branches of the plantar arteries, which reach the rete by perforating the plantar fascia.

²⁴⁴ (Fig. 1045, p. 653.) The fascia covering the popliteus muscle is reinforced by, and, indeed, to a large extent derived from, a downward expansion of the tendon of insertion of the semimembranosus muscle.

²⁴⁵ *Lower Limit of the Popliteal Artery* (Ibid.).—There is some inconsistency in the account given both by Quain and by Macalister of the lower limit and point of division of the popliteal artery. According to the former author, "the popliteal artery . . . reaches from the opening in the adductor magnus to the lower border of the popliteus muscle, where it divides into the anterior and posterior tibial arteries." But in describing the relations of the artery Quain states that "its termination is beneath the upper margin of the soleus muscle" (*op. cit.*, vol. ii., part ii., p. 493). Macalister also states that the artery divides "at the lower border of the popliteus muscle" (*op. cit.*, p. 499); and a few pages later, in describing the termination of the artery, he tells us that it is exposed by removing the gastrocnemius and the soleus muscles (p. 509). Now, these statements are irreconcilable, for the *popliteal or oblique line* of the tibia (see Fig. 334, p. 136, in Part I.), which gives origin to the soleus muscle, at the same time marks the lower limit of the insertion of the popliteus muscle. Hence these muscles do not overlap, as is well shown by Fig. 612, p. 363, in Part III., and if the popliteal artery really divided at the lower border of the popliteus muscle, the soleus muscle could not possibly lie behind its termination. The description given by Von Langer and Toldt of the ending of this artery is at once more accurate and more consistent than that of the English anatomists just quoted. The German authors ("Anatomy," 7th ed., p. 527) describe the vessel as passing down behind the popliteus muscle to enter what they call the "*popliteal canal*" (see note²³⁴ above)—i.e., the space beneath (anterior to) the *tendinous arch of the soleus muscle*, and immediately thereafter dividing into anterior and posterior tibial arteries (see also note²⁴⁰ below). The entrance to the "*popliteal canal*" is also shown in Fig. 612. In not a few instances, indeed, the popliteal artery divides, as described by Quain and Macalister, at the lower border of the popliteus muscle, and in such cases, as stated in note³ to p. 363, Part III., it is the *posterior tibial* vessels and nerve that enter the "*popliteal canal*"; but this high division of the artery precludes the possibility of its termination lying beneath the upper part of the soleus muscle.

²⁴⁶ *Soleus Muscle* (Fig. 1046, p. 654).—It is somewhat inconsistent of the author to speak of the *tibial head (caput)* and the *fibular head* of the soleus muscle, inasmuch as he gives the name of *triceps surae* to the gastrocnemius and soleus, considered as a single three-headed muscle (see Figs. 617 and 618, pp. 368 and 369, in Part III.), of which two heads, the inner and outer head of the gastrocnemius, are superficial and attached to the femur, whilst the third head, the soleus, is deep, and attached to the bones of the leg. Moreover, the fibres from the fibula, those from the tendinous arch, and those from the tibia, form a continuous muscular mass, which is not separable into distinct heads (see Fig. 612, p. 363, in Part III.). Quain, however, falls into the same error when he writes: "The tibial head of the soleus is almost peculiar to man: among the lower animals it occurs, of small size, only in the gorilla, and sometimes in the chimpanzee" (*op. cit.*, vol. ii., part ii., p. 264). It should, of course, read "the tibial origin of the soleus," etc.

²⁴⁷ *Communicating Branches between Posterior Tibial and Peroneal Arteries* (Ibid.).—Quain writes (*op. cit.*, vol. ii., part ii., pp. 496, 497): "A communicating branch passes transversely beneath the flexor longus hallucis muscle, between the posterior tibial and peroneal arteries, about an inch above the ankle-joint. A second loop of communication between these vessels is sometimes present, lying in the fat beneath the tendo Achillis." It is this second loop which is seen in Fig. 1046, just above the severed extremity of the tendo Achillis; and in Fig. 1047, in addition to both the vessels above described, we see a large communicating branch two or three inches above the ankle-joint. In Von Langer and Toldt's "Anatomy" (7th ed., p. 528) the principal communicating branch between these vessels is called *ramus anastomoticus*.

²⁴⁸ "*Fibular Branch of the Anterior Tibial Artery*" (Fig. 1047, p. 655).—Quain and Macalister agree in calling this small vessel the *superior fibular branch*; but as there is no *inferior fibular branch*, the name used in the text is to be preferred.

²⁴⁹ *Division of the Popliteal Artery* (Ibid.).—As explained in note²³⁸ above, Von Langer and Toldt describe the popliteal artery as entering the "*popliteal canal*," and "immediately thereafter dividing into anterior and posterior tibial arteries." It is necessary to add that the German authors regard the *anterior tibial artery* as a *branch of the popliteal artery*, which latter vessel, in their view, terminates nearly an inch below the origin of the anterior tibial by division into the *posterior tibial* and *peroneal arteries*. According to the description usually given by English anatomists, on the other hand, the terminal branches of the *popliteal artery* are the *anterior* and *posterior tibial arteries*, while the *peroneal artery* is regarded as a *branch of the posterior tibial artery*. The difference is solely one of terminology.—I may, in conclusion, mention an actual but somewhat rare variety in which the popliteal artery divides into three terminal branches: the anterior tibial, posterior tibial, and peroneal arteries.

²⁵⁰ *Branches of Internal Plantar Artery* (Fig. 1048, p. 656).—According to Von Langer and Toldt (*op. cit.*, p. 529), this vessel divides into a *ramus superficialis (superficial branch)* which supplies the abductor hallucis muscle, and a *ramus profundus (deep branch)* which sinks deeply into the inner plantar furrow (the interval between the abductor of the great toe and the short flexor of the toes). Quain (*op. cit.*, vol. ii., part ii., p. 498) enumerates the branches of the internal plantar artery as follows: (a) Small communicating branches to the digital arteries of the three inner clefts; (b) muscular branches; (c) cutaneous branches in the inner plantar furrow; (d) cutaneous branches to the inner border of the foot; (e) deep offshoots to the bones and joints of the foot;

and, finally, (f) the internal plantar artery terminates opposite the head of the first metatarsal bone by joining the digital artery to the inner side of the great toe. According to Macalister (*op. cit.*, p. 515), one of the branches of the internal plantar artery, which accompanies and overlies the internal plantar nerve, "may join the superficial branch of the external plantar artery to form a *superficial plantar arch*. This, however, is seldom large enough to admit coarse injection."

²³¹ *Plantar Digital Arteries* (Ibid.).—The four arteries passing from the (deep) plantar arch to the four clefts between the toes, where they divide into the *collateral digital arteries*, "are called, on account of their course in the interosseous spaces of the metatarsus, *arteria metatarsæ plantares* [*plantar metatarsal arteries*]" (Von Langer and Toldt, *op. cit.*, p. 529). In England, however, these vessels are known simply as (*plantar*) *digital arteries*; sometimes, however, to distinguish them from the *collateral digital arteries* into which they divide, the digital trunk before division are known as the *common digital arteries*. (Cf. note ²³³, on the nomenclature of the digital arteries of the hand.)

²³² *Fascia Iliopectinea* (Fig. 1050, p. 658).—The exact significance of this term as used by the author is explained in note ¹ to p. 390, in Part III. Here we see it forming the posterior layer of the femoral or crural sheath.

²³³ (Ibid.) Or *pubic portion of the fascia lata*; this is continuous above and externally with the fascial layer called by the author *fascia iliopectinea* (see note ²³² above, also the description at the foot of Fig. 598, p. 349, in Part III).

²³⁴ *Nervus Tibialis* (Figs. 1054, 1055, p. 660).—In the author's nomenclature, the name *nervus tibialis* is given to the larger of the two terminal branches of the *great sciatic nerve* from the point of division of the parent trunk until the **tibial nerve* itself divides (usually just below the internal annular ligament of the ankle) into the *internal and external plantar nerves*; in England, however, the upper part of this nerve, as far as the lower border of the popliteus muscle, is known as the *internal popliteal nerve*, and for the rest of its course it receives the name of *posterior tibial nerve*.

²³⁵ **Dorsal Interosseous Fascia* (Fig. 1056, p. 660).—"In connexion with the extensor brevis digitorum muscle, we find a well-developed *deep layer* of the *deep fascia of the dorsum of the foot*, known as the *fascia interossea dorsalis*, which forms a covering for the muscle and for the dorsal artery of the foot, and is connected above with the deep layer of the anterior annular ligament of the ankle" (Von Langer and Toldt, *op. cit.*, p. 267). Quain says merely: "The *fascia of the dorsum of the foot* is reduced to a thin membrane prolonged from the anterior annular ligament over the extensor tendons. Beneath it, deeper layers of fascia are placed over the short extensor of the toes and the interosseous muscles" (*op. cit.*, vol. ii., part ii., p. 268).

²³⁶ **Plantar Interosseous Fascia* (Ibid.).—"In the region of the metatarsus, the principal branch of the external plantar artery runs between the second and the third layer of muscles, covered by the easily demonstrated *fascia interossea plantaris*, which separates the interosseous muscles from the adductor hallucis" (Von Langer and Toldt, *op. cit.*, p. 268). Reference to Part III. of this Atlas, Fig. 627, p. 378, and Fig. 628, p. 379, will show that the deep part of the external plantar artery and the fascial layer in question is between the *third and fourth* layers of the muscles of the sole as there enumerated, and not between the second and third, a different system of grouping being adopted. The **plantar interosseous fascia* is not described by Quain or Macalister, except vaguely, as "*fascia covering the interosseous muscles*."

²³⁷ **Deep Layer of the Deep Fascia of the Sole* (Ibid.).—No account of the **fascia plantaris profunda* is to be found even in Von Langer and Toldt's "Anatomy." Examination of Fig. 1055 shows it to lie between the second and third layers of the muscles of the sole, and that it is, in fact, the layer of areolar tissue covering the adductor obliquus hallucis muscle.

²³⁸ *Presacral Venous Plexus* (Fig. 1057, p. 662).—"The *lateral sacral veins* form, by their communications with one another and with the *middle sacral veins*, a plexus over the anterior surface of the sacrum. They receive branches from the sacral canal through the anterior sacral foramina, and open at two or three points into the internal iliac veins" (Quain, *op. cit.*, vol. ii., part ii., p. 540). The *middle sacral veins* unite (in most cases) to form a common trunk, which usually enters the left common iliac vein. The name I have selected as the most suitable English equivalent for the author's *plexus sacralis anterior* is used by Macalister. The plexus communicates in front with the hæmorrhoidal (or rectal) venous plexus, and behind with the anterior internal vertebral venous plexus (see note ²³⁷ below).

²³⁹ *Venous Plexuses of the Vertebral Column* (Figs. 1061, 1062, p. 665).—Neither Quain nor Macalister employs a complete series of English terms corresponding to those used by Toldt in his description of the venous plexuses of the vertebral column. Quain, in his account of the veins of the spine, mentions the plexuses connected with these veins, but gives them no distinctive names. I have, therefore, given in the text the literal English equivalents of the Latin terms used by the author, except that I use the word *plexus* in the singular where he uses it in the plural. The **posterior external vertebral plexus* (see note ²³⁹ below), for instance, is, as Macalister says, "longitudinally continuous from the sacrum to the skull," and the same is true of the other *vertebral plexuses*. The author, however, regards the *internal vertebral venous plexuses* as made up of a chain of connected segmental plexuses (see note ²³⁹ below). Alternative names for some of the vertebral plexuses are given in the notes in the usual manner.

²⁴⁰ **Posterior External Vertebral Venous Plexus* (Ibid.).—Macalister calls this the *plexus dorsalis* (of the vertebral column). According to Quain (*op. cit.*, vol. ii., part ii., pp. 532, 533), "the *dorsal spinal veins* are derived from the muscles and integument of the back, and form a plexus over the arches of the vertebrae." In another place in the same volume (p. 531) he calls it the *dorsal spinal plexus*. See also note ²³⁹ above.

²⁴¹ *The Condylar Emissary Vein, and the Venous Rete of the Anterior Condylar Foramen* (Fig. 1063, p. 666).—The *condylar emissary vein* passes from the lateral (sigmoid) sinus through the *posterior condylar foramen* to the beginning of the vertebral vein. It is distinguished by Macalister as the *posterior condyloid vein* from what this author calls the *anterior condyloid vein*. The latter is described by Quain (who does not, however, employ the name just given) as a venous ring surrounding the hypoglossal nerve in the *anterior condylar foramen*, which communicates internally with the occipital sinus and the intraspinal veins, externally with the vertebral veins and the plexus on the front of the spine (*i.e.*, the **anterior external vertebral plexus* of Toldt—see Fig. 1066, p. 669). The so-called *anterior condyloid vein* is shown in Fig. 1080, p. 685, under the name of **venous rete of the anterior condylar foramen*. Von Langer and Toldt describe it as follows: "The emissary veins from the venous ring surrounding the foramen magnum pass outwards through the anterior condylar foramina and, with their tributaries, form a network around the hypoglossal nerves, and are known as *retia canalis hypoglossi*" (*op. cit.*, p. 541).

²⁰² (Ibid.) Concerning the author's application of the term *arteria transversa colli* (transverse cervical artery), see Appendix, notes ¹³⁴, ¹⁵³, ¹⁷³ and ²⁰³; similar considerations apply to the use of the term *vena transversa colli* (transverse cervical vein). Macalister gives *posterior scapular* as an alternative name for these vessels.

²⁰³ **Posterior Internal Vertebral Venous Plexus* (Fig. 1064, p. 667).—"Within the spinal canal and on the back of the theca vertebralis there is a close plexus of veins, the *postero-internal plexus*, whose main trunks are longitudinal on the inside of the articular masses" (Macalister, *op. cit.*, p. 260). "The *posterior longitudinal spinal veins* . . . two in number . . . are often much broken up in parts of their course, and they communicate with one another by numerous cross-branches on the anterior surface of the arches of the vertebræ" (Quain, *op. cit.*, vol. ii., part ii., p. 533). Here we have two different modes of regarding the same anatomical data. See also note ²²⁹ above.

²⁰⁴ *Lateral and Sigmoid Sinuses* (Ibid.).—The common English usage is to extend the meaning of the term *lateral sinus* so as to include that sinus which [following Macalister as well as Toldt] is here distinguished as the *sigmoid sinus*. Thus, according to Quain and the majority of English anatomists, the *lateral sinus* extends from the internal occipital protuberance to the jugular foramen. In this work, however, it is regarded as extending from the internal occipital protuberance to the point where the channel for the sinus passes from the cerebral surface of the parietal to the cerebral surface of the temporal bone. At this point the lateral sinuses "in their archaic fetal condition communicated through the post-glerid foramen with the primitive external jugular vein, but this connexion early diminishes, and is ultimately represented only in rudiment by the mastoid vein; an original small channel of communication from the lateral sinus to the posterior lacerate foramen becomes commensurately dilated, and appears in the adult as its continuation, the *sigmoid sinus*" (Macalister, *op. cit.*, p. 533).

²⁰⁵ **Venous Role of the Intervertebral Foramen* (Ibid.).—Writing of the posterior longitudinal spinal veins and the *posterior internal vertebral venous plexus* (see note ²⁰³ above), Quain states (*op. cit.*, vol. ii., part ii., p. 533): "From the plexus . . . offsets pass outwards to the intervertebral foramina, where they join the similar branches given off by the anterior longitudinal veins, and form a plexus around the issuing nerve;" but this author does not make use of the name given above. Macalister merely says that through each intervertebral foramen there emerges an outflowing *ramus spinialis* [i.e., the *intervertebral vein*] to join the *plexus dorsalis* [i.e., the *posterior external vertebral venous plexus*—see note ²⁰⁰ above].

²⁰⁶ *Torcular Herophili, or Confluence of the Sinuses* (Ibid.).—Properly this name should be applied only to a somewhat rare arrangement of the sinuses, when a true *confluens sinuum* is exhibited at the common meeting-point of the superior longitudinal sinus, the straight sinus, the occipital sinus, and the right and left lateral sinuses. The usual arrangement is for the superior longitudinal sinus to be continued into the right lateral sinus, a dilatation marking the angle of union, this dilatation receiving the occipital sinus, and being conventionally called the *torcular Herophili*; the straight sinus turns to the left into the left lateral sinus, and the right and left lateral sinuses are commonly connected at their origin by a larger or smaller communicating vein. Sometimes this arrangement is reversed, the superior longitudinal sinus being continued into the left, the straight sinus into the right lateral sinus. (See Fig. 1234, p. 804, in Part VI.) The lateral sinus that receives the superior

longitudinal sinus is larger than that which receives the straight sinus. Something approaching a true *confluence of the sinuses* is seen in Fig. 1064, in which the superior longitudinal sinus divides, a larger right division being continuous with the right lateral sinus, and a smaller left division being continuous with the left lateral sinus. The termination of the straight sinus in this specimen is not apparent in the figure, but the occipital sinus passes to the commencement of the right lateral sinus.

²⁰⁷ **Anterior Internal Vertebral Venous Plexus* (Fig. 1065, p. 668).—The *postero-internal plexus*, says Macalister (*op. cit.*, p. 260), is connected by transverse branches "with the still larger *anterior internal plexus*, which lies on the backs of the bodies of the vertebræ. The main stems of this latter are two long veins which pass from end to end of the vertebral canal on the roots of the pedicles of the vertebræ. Across the back of every body these are joined by a cross-branch. Each of these anterior transverse branches receives the *basi-vertebral vein* from the cancelli of the vertebral body." Quain gives no name to this plexus, but states (*op. cit.*, vol. ii., part ii., p. 533) that "the *anterior longitudinal spinal veins* are two large plexiform vessels which extend the whole length of the spinal canal, lying behind the bodies of the vertebræ, one along each edge of the posterior common ligament." Young (U.S.) calls this plexus the *anterior intraspinal plexus*. (See also note ²⁰⁰ above.)

²⁰⁸ *Basi-vertebral Veins* (Ibid.).—Quain calls these veins the *internal veins of the bodies of the vertebræ*, which is cumbersome. The name *basi-vertebral veins* is current, and sufficiently distinctive. Young (U.S.) calls them *vena basis vertebrarum*, of which the name used in the text is a convenient modification. For their connexion with the *anterior internal vertebral plexus*, see note ²⁰⁷ above.

²⁰⁹ **Venous Retia of the Vertebræ* (Ibid.).—"The *plexus venosi vertebrales interni* are mainly constituted by individual circularly-disposed extrathecal networks, the *retia venosa vertebrarum*, which, in each vertebra, are attached in front to the posterior surface of the vertebral body, and are in apposition behind with the neural arch. There are, therefore, as many vertebral venous retia as there are vertebræ in the spinal column. Their series is completed above by a plexiform vascular ring surrounding the foramen magnum" (see notes ²⁰⁰ and ²⁰¹ above).—Von Langer and Toldt, *op. cit.*, p. 540.

²¹⁰ **Venous Plexus of the Nipple* (*Circulus Venosus of Haller*) (Fig. 1068, p. 671).—Von Langer and Toldt, after stating that the veins of the breast correspond in distribution and nomenclature with the arteries of that organ, write (*op. cit.*, p. 411): "Noteworthy is the *plexus venosus mamilla* in the region of the areola, which is nothing more than a ring-shaped anastomotic chain of small subcutaneous veins surrounding the nipple (mamilla)." The term *venous plexus of the nipple* is not used by Quain or Macalister, but the former authority remarks (*op. cit.*, vol. iii., part iv., p. 290) that "Haller described a sort of anastomotic venous circle surrounding the base of the nipple as the *circulus venosus*"; and the latter, describing the blood-supply of the breast, writes (*op. cit.*, p. 264): "Some of the veins are deep, and accompany the arteries; others form a superficial circle of anastomosis in the areola, and end in the superior thoracic vein."

²¹¹ **Costo-axillary and Thoracic-epigastric Veins* (Ibid.).—"Of considerable importance are the anastomotic connexions between the axillary vein and the intercostal veins, on the one hand, and between the axillary vein and the subcutaneous venous network of the anterior abdominal wall, on the other. The former is affected by a number of venous radicles, known as the *venæ*

costo-axillares, which arise in the region of distribution of the seven uppermost intercostal veins, and open by a common trunk into the axillary vein. The second series of communications takes place by means of the **vena thoraco-epigastrica*; these arise in the region of distribution of the superficial epigastric vein or are directly continuous with the branches of this vein and run on each side of the trunk directly upwards to the axilla, where they open into the axillary vein, sometimes by an independent trunk, sometimes by joining the long thoracic vein. Since the superficial epigastric vein is a tributary of the femoral vein, this elongated anastomosis affords a direct channel of communication between the axillary vein and the femoral vein" (Von Langer and Toldt, *op. cit.*, p. 547).

²⁷² *External Pudic Arteries and Veins* (Ibid.).—These are two in number, *superior* and *inferior*. Both the veins are seen in Fig. 1068; but of the arteries, the *superior* only is visible, the *inferior* being beneath the fascia lata. For the names given to these vessels by Macalister, see note ² to p. 599.

²⁷³ *Venous Circle of the Umbilicus and Para-umbilical Veins* (Ibid.).—The **venous circle of the umbilicus*, which is not described by Quain or by Macalister, is an anastomotic chain of small subcutaneous veins surrounding the navel, similar to the *circulus venosus* of Haller surrounding the nipple (see note ²⁷⁰ above). The *para-umbilical veins*, in the peritoneum adjacent to the umbilicus and to the round ligament of the liver, form one group of the *accessory portal veins* described by Sappey; it is the communications they form with the **venous circle of the umbilicus* that are indicated in Fig. 1068. In obstruction of the portal circulation, this group of communicating veins forms one of the principal channels of collateral circulation, and it is their enlargement that constitutes the pathological condition known clinically as *caput medusæ*.

²⁷⁴ *Subcutaneous Dorsal Veins of the Penis* (Ibid.).—As seen in Fig. 1068, these vessels are tributaries of the *external pudic veins* (see note ²⁷² above). They must be carefully distinguished from the *dorsal vein of the penis* proper (see Fig. 1069, p. 672, and Fig. 1070, p. 673), which enters the pelvis and terminates in the *prostatic venous plexus*. See also note ²⁷⁵ below.

²⁷⁵ *Vesical, Prostatic, and *Pudendal Venous Plexuses* (Fig. 1069, p. 672).—The *vesical venous plexus* consists of veins which ramify over the whole surface of the bladder external to its muscular coat; they are larger and more numerous round the base of the organ, receiving here veins from the ureters, the vasa deferentia, and the vesiculæ seminales, and communicating freely with the prostatic and hæmorrhoidal plexuses. The *prostatic venous plexus*, which is formed largely by the breaking up of the *dorsal vein of the penis*, ramifies between the two layers of the pelvi-prostatic capsule (see Appendix to Part IV., note ⁷⁴). Its connexion with the vesical plexus is so intimate that Macalister describes the two under a joint name as the *prostaticovesical plexus* (*op. cit.*, p. 428). In the female, the place of the prostatic plexus is taken by a plexus surrounding the upper part of the urethra and receiving the *dorsal vein of the clitoris*; the *vaginal plexus* also communicates freely with the vesical plexus in front and the hæmorrhoidal plexus behind. Thus, the **pudendal venous plexus* of Toldt (the term is little used in England) is made up in the male of veins regarded by English anatomists as belonging to the prostatic and vesical plexus; and in the female, of veins belonging to the peri-urethral, vesical, vaginal, and uterine plexuses. See Appendix to Part IV., note ¹⁰⁵.

²⁷⁶ (Fig. 1070, p. 673.) The *obturator fascia* (*parietal layer of the pelvic fascia*) has here split to form the channel for the internal pudic vessels, known as Alcock's canal. See Appendix, note ¹⁴⁵.

²⁷⁷ *Spermatic Vein* (Ibid.).—This is called by the author *vena spermatica interna* to distinguish it from the *vena spermatica externa*—the *cremasteric vein* of English anatomists. As a synonym for *vena spermatica interna*, the author employs the name *vena testicularis* in the male, and *vena ovarica* in the female.

²⁷⁸ (Ibid.) An account of the anomalous origin of the *obturator artery* from the *deep or inferior epigastric artery* is given in note ¹ to p. 388, in Part III. of this work.

²⁷⁹ **Subcutaneous Venous Plexus of the Anus* (Fig. 1072, p. 675).—This name is not used by Quain or Macalister, but the latter authority speaks of the veins under consideration as "the system of *anal* (proctodal) veins." The plexus consists of the terminal ramification of the branches of the *inferior or external hæmorrhoidal veins* (also called the *anal veins*, see note ¹⁴⁰ above), and communicates freely within the anal canal with the *hæmorrhoidal or rectal venous plexus* (see Fig. 1073, p. 676), of which, indeed, the *anal venous plexus* is considered by English anatomists to form the lowest part.

²⁸⁰ (Fig. 1073, p. 676.) English anatomists commonly include in the *hæmorrhoidal or rectal venous plexus* that which the author separately describes as the *subcutaneous venous plexus of the anus*. See Fig. 1072, p. 675, and note ²⁷⁹ above.

²⁸¹ *Uterovaginal Venous Plexus* (Ibid.).—English anatomists usually speak of separate *uterine* and *vaginal* venous plexuses. These plexuses, of course, communicate somewhat freely; but on the whole the venous blood from the body of the uterus passes by means of the *uterine plexus* to the *ovarian* or *pampiniform venous plexus* and the *inferior vena cava*, that from the neck of the uterus and from the vagina by means of the *vaginal plexus* to the *internal iliac vein*.

²⁸² **Nasofrontal Vein* (Fig. 1077, p. 682).—This name, which is not employed by Quain or by Macalister, is given by the author to the anterior extremity of the *superior ophthalmic vein*, which communicates with the *angular vein*.

²⁸³ *Anterior, Posterior, and Common Facial Veins* (Ibid.).—It will be noticed that the author's name for the *facial vein* of English anatomists is *vena facialis anterior*, and the name *anterior facial vein* is occasionally used in England also to distinguish this vein from that which is sometimes called the *posterior facial vein* (*vena facialis posterior* of the author), but which is better known as the *temporomaxillary vein* (see Fig. 1077, p. 682). This latter is a short trunk, not infrequently plexiform, formed opposite the neck of the lower jaw by the union of the *temporal* and the *internal maxillary veins*. Near the angle of the jaw the *temporomaxillary vein* divides into two parts. The *anterior division* joins the *facial vein* to form a short trunk, the *vena facialis communis* of the author, sometimes known in England also as the *common facial vein* (see Fig. 1077); this opens into the *internal jugular vein* about the level of the hyoid bone. The *posterior division* of the *temporomaxillary vein* (called by Macalister the *communicating branch* from the *temporomaxillary* to the *external jugular vein*) unites with the *posterior auricular vein* to form the *external jugular vein*. (The arrangement shown in Fig. 1077 does not correspond fully to the above description, which is, however, that generally accepted as normal.)

²⁸⁴ **Deltoïd Veins* (Ibid.).—No English equivalent of the term *vena deltoidea*, used in Fig. 1077, is to be found in the works of Quain or Macalister. Examination of the figure shows that one of the veins thus denoted is the companion vein of one of the thoracic or pectoral branches of the *acromiothoracic artery*, while the other is a tributary of the cephalic vein.

²⁸⁵ (Ibid.) Regarding the author's use of the term *superficial cervical artery*, see Appendix, notes ¹³⁴, ¹³⁵, ¹⁷⁵, and ³⁰⁸. The same

considerations apply to his use of the term *superficial cervical vein*.

²²⁶ *Ranine Vein* (Fig. 1078, p. 683).—"The lingual artery is accompanied by two small *vena comites*, but the largest vein of the tongue is the *ranine*, which lies external to the artery of the same name, and, after being joined by *sublingual branches*, passes backwards over the hyoglossus muscle with the hypoglossal nerve. These veins end in the internal jugular" (Ellis, "Demonstrations of Anatomy," 10th ed., p. 97). The *ranine vein*, called by the author, from its course adjacent to the hypoglossal nerve, *vena comitans nervi hypoglossi*, thus returns the greater part of the blood carried to the tongue by the *lingual artery* and its continuation the *ranine artery* (called by the author *arteria profunda lingue*); but the vein and the nerve lie superficial to, while the artery lies beneath, the hyoglossus muscle.

²²⁷ *Veins of the Temporomandibular Articulation* (Ibid.).—Among the tributaries of the *temporal vein*, Quain mentions "branches from a plexus which surrounds the articulation of the lower jaw, and into which one or two small veins issuing from the tympanum by the fissure of Glaser pour their contents," but he does not give these vessels any distinctive name.

²²⁸ **Submaxillary Fossa* (Fig. 1079, p. 684).—The name of *fossa submaxillaris* is given by the author to the space between the superficial and deep layers of the deep cervical fascia, in which the submaxillary gland lies, bounded above by the lower margin of the mandible, below by the anterior belly of the digastric muscle, and behind by the stylomaxillary ligament. In Quain's terminology this region is the *submaxillary triangle*; in Macalister's, it is the *anterior half of the digastric space*.

²²⁹ *Suprascapular Fossa* (Ibid.).—In the terminology of English anatomists there is one *suprascapular fossa* only, viz., the lower part of the posterior triangle of the neck. This, however, is called by the author "*fossa suprascapularis major*, the **greater suprascapular fossa*; while he gives the name of **fossa suprascapularis minor*, the **lesser suprascapular fossa*, to the depression above the sternal extremity of the clavicle which corresponds to the interspace between the two heads of the sternocleidomastoid muscle.

²³⁰ *Basilar Venous Plexus or Basilar Sinus* (Fig. 1080, p. 685).—This is sometimes also called the *transverse sinus*, but the name is better avoided, since the occipital portion of the *lateral sinus* is known in the Continental nomenclature as *sinus transversus* (see note ²²⁴ above). According to Von Langer and Toldt, the *basilar venous plexus* is to be regarded as an upward extension of the **anterior internal vertebral venous plexus* (see note ²²⁷ above), with which it communicates through the foramen magnum. On each side it opens into the *inferior petrosal sinus*. The *basilar venous plexus* must be carefully distinguished from the *basilar* or *basal vein*, *vena basalis* (Rosenthal). See Fig. 1086, p. 691, and note ²³⁷ below.

²³¹ *Rete Canalis Hypoglossi and Emissarium Canalis Hypoglossi* (Ibid.).—According to Quain (*op. cit.*, vol. ii., part ii., p. 526), "A venous ring surrounds the hypoglossal nerve in the anterior condylar foramen, and communicates internally with the occipital sinus and intraspinal veins, externally with the vertebral vein and the plexus on the front of the spine." Von Langer and Toldt describe as normal the existence of a venous network round the hypoglossal nerve, known as the **venous rete of the anterior condylar foramen*, and shown in the right side of Fig. 1080; a variety is the existence of a single, comparatively large, emissary vein in this situation, the **emissary vein of the anterior condylar foramen* (called by Macalister the *anterior condylar vein*), shown in the left side of Fig. 1080. See also note ²⁰¹ above.

²³² **Venous Rete of the Foramen Ovale* (Fig. 1082, p. 687).—This name is not used by Quain or Macalister, but the former, in his description of the emissary veins, writes (vol. ii., part ii., p. 526): "One or two considerable veins descend from the cavernous sinus through the foramen ovale, as well as small ones through the fibrous tissue in the foramen lacerum, to the pterygoid and pharyngeal plexuses. There is frequently another vein passing through the foramen of Vesalius."

²³³ *Lacunæ Laterales* (Fig. 1083, p. 688).—"Communicating with the superior longitudinal sinus from its anterior end as far back as the beginning of the occipital region are a number of diverticula, from 0.5 to 3 cm. long, which form a series of venous lacunæ (*lacunæ laterales* of Key and Retzius) receiving the independent meningeal veins, and some veins from the diploë, and are invaginated by Pacchionian granulations. These venous lacunæ are not entirely confined to the region of the superior sinus, but some may occur in the neighbourhood of other sinuses, especially the lateral and straight sinus" (Quain, *op. cit.*, vol. iii., part i., p. 184).

²³⁴ (Fig. 1084, p. 689). The *superior thyroid vein* sometimes opens directly into the *internal jugular vein*, sometimes, as in the specimen shown in Fig. 1084, into the *common facial vein*. Regarding the last-named vein, see note ²³⁵ above.

²³⁵ *Palatine Veins* (Ibid.).—Quain describes two palatine veins, a *superior palatine vein*, which enters the *pterygoid venous plexus*, and an *inferior palatine vein*, which returns the blood from a plexus surrounding the tonsil and from the soft palate, runs downwards beside the pharynx, and opens usually into the *facial vein* near to its proximal extremity. The *inferior palatine vein* of Quain is the vein called *vena palatina* in the author's terminology. The *sphenopalatine vein* (the companion vein of the nasal or sphenopalatine artery), like the superior palatine vein, joins the pterygoid venous plexus.

²³⁶ *Arachnoidal Villi or Pacchionian Bodies* (Fig. 1085, p. 690).—The nature of these bodies having long remained uncertain, they are variously known as *Pacchionian bodies* (*corpora Pacchionii*), *Pacchionian glands* (*glandulae Pacchionii*), and *Pacchionian granulations* (*granulationes Pacchionii*); Luschka, however, has shown conclusively that they are really enlarged *arachnoidal villi*.

²³⁷ *Basilar or Basal Vein (Vena Basalis Rosenthal)* (Fig. 1086, p. 691).—This vein, which winds backwards round the crus cerebri to open into the vein of Galen just before it unites with its fellow, forms an anastomotic communication between that vein and the small veins of the base of the brain, and is formed by the confluence of some of these latter, viz., the *anterior cerebral vein*, the *deep Sylvian vein*, and the *inferior striate veins*. It must not be confused with the *basilar venous plexus* or *basilar sinus*, which is shown in Fig. 1080, p. 685, and described in note ²³⁰ above.

²³⁸ *Veins of the Spinal Cord* (Ibid.).—Both Quain and Macalister speak generally of the *veins of the spinal cord* without any attempt at further precision in their nomenclature. According to Von Langer and Toldt (*op. cit.*, p. 599), "the veins of the spinal cord are arranged in two sets: a *superficial set*, *vena spinales externa* (the *external spinal veins*), which, like the arteries, run on the anterior and posterior surfaces, respectively, of the spinal cord: *vena spinales externa anteriores et posteriores* (anterior and posterior external spinal veins); and a *deep set*, *vena spinales interna* (the *internal spinal veins*), which are situated within the substance of the spinal cord in the neighbourhood of the central canal. The two sets communicate by horizontal branches; and other horizontal branches, running along the roots of the spinal nerves, connect the *external spinal veins* with the *internal vertebral venous plexuses*. (See note ²³⁸ above.)

²⁹⁹ *Deep Median Vein* (Fig. 1087, p. 694).—The author, in the original German edition of this work, calls the *deep median vein* "the communicating branch between the superficial and the deep veins (*ramus anastomoticus*)."²⁹⁹ Macalister calls it *vena mediana profunda*.

³⁰⁰ **Intercapital Veins* (Fig. 1088, p. 695).—"The palmar veins of all the fingers [*palmar digital veins*] are connected in the interdigital folds by a transverse chain of anastomoses; from each anastomotic loop a short venous trunk, the *vena intercapitalis*, passes backwards to the veins of the dorsum of the hand, and these trunks convey by far the greater portion of the blood from the palmar digital veins" (Von Langer and Toldt, *op. cit.*, p. 548).

³⁰¹ *Palmar Digital Veins* (Ibid.).—As in the case of the *palmar digital arteries* (see Appendix, note ²⁹³), the author distinguishes between the *vena digitales volares propriæ* (*proper palmar digital veins*—see Fig. 1088, p. 695), which are situate on the palmar surfaces of the fingers themselves, and the *vena digitales volares communes* (*common palmar digital veins*—see Fig. 1093, p. 700), which convey along the palmar surface of the metacarpus from the base of the fingers to the *superficial palmar venous arch* that portion of the blood that is not carried to the dorsum of the hand by the **intercapital veins* (see note ³⁰⁰ above).

³⁰² **Dorsal Metacarpal Veins, etc.* (Fig. 1089, p. 696).—In Quain's "Anatomy," and to a lesser extent also in Macalister's "Anatomy," the description and therefore the nomenclature of the venous system, especially as regards the veins of the extremities, is less full and less precise than that of Von Langer and Toldt, whose terminology is used in this Atlas. In the case of the *dorsal metacarpal veins*, and in several other instances, I have therefore given a literal translation of the Latin names used by the author.

³⁰³ **Accessory Cephalic Vein* (Ibid.).—"The name *vena cephalica accessoria* is given to a vein, often of considerable size, which is mainly a continuation of the **fourth dorsal metacarpal vein* [see note ³⁰² above]; this vessel crosses the back of the forearm obliquely, running upwards and outwards to join the *radial vein* in the upper part of the forearm, or the *cephalic vein* just above the bend of the elbow" (Von Langer and Toldt, *op. cit.*, p. 549).

³⁰⁴ *Dorsal Venous Rete (or Plexus) of the Hand* (Ibid.).—Macalister describes this plexus as consisting of two parts: "The *internal dorsal plexus* is formed by the union of a vein from the little finger [*vena Salvatella*] with veins from the third and fourth interdigital cleft. The *external dorsal plexus* is formed by the junction of a vein from the thumb [*vena cephalica pollicis*] with veins from the index and middle fingers" (*op. cit.*, p. 278).

³⁰⁵ *Cephalic and Radial Veins* (Fig. 1090, p. 697).—According to the English nomenclature, the *radial vein* begins in the outer part of the *dorsal venous plexus of the hand*, runs upwards along the outer side of the forearm to join the *median cephalic vein* a little above the elbow, in the outer bicipital groove; the trunk formed by the confluence of these vessels is in England known as the *cephalic vein*. The author gives the name of *vena cephalica* both to the *radial* and to the *cephalic veins* of English anatomists; he sometimes, however, distinguishes the former as *vena cephalica* (*antibrachii*), and the latter as *vena cephalica* (*humeri*).

³⁰⁶ *Basilic and Ulnar Veins* (Ibid.).—The *anterior* and *posterior ulnar veins* of English anatomists (*anterior* and *posterior superficial ulnar veins*, according to Macalister), the former commencing on the hypothenar eminence and running upwards along the ulnar side of the front of the forearm, and the latter commencing in the inner part of the *dorsal venous plexus of the hand* and running upwards along the ulnar side of the back of the forearm, unite

as a rule a little below the elbow, the common trunk passing in front of the internal condyle to the inner bicipital groove, where by its confluence with the *median basilic vein* it forms the *basilic vein*. The author gives the name of *vena basilica* both to the *anterior ulnar* and to the *basilic veins* of English anatomists; he sometimes, however, distinguishes the former as *vena basilica* (*antibrachii*), and the latter as *vena basilica* (*humeri*).

³⁰⁷ **Capital Vein of the Arm* (Ibid.).—Macalister, at the conclusion of his description of the superficial veins of the upper limb, writes (*op. cit.*, p. 278): "These veins are variable in relative size and arrangement. The basilic is the stem towards which all at first converged, and the radial originally crossed from without at the elbow to join it, receiving in its course the median and a descending branch from the outer bicipital sulcus. The adult form of the cephalic vein is a secondary development due to the dilatation of a communication between the uppermost radicle of this descending vein, and one of the thoracohumeral veins. Intermediate forms are common." The arrangement of veins shown in the left-hand specimen of Fig. 1090 is obviously an example of the persistence of the primitive arrangement above described, the vein called *vena capitalis brachii* being really the *basilic vein*.

³⁰⁸ **Median Vein of the Elbow* (Ibid.).—The arrangement of the veins in front of the elbow usually described as normal is for the *median vein*, after receiving the *deep median vein*, to divide into *median basilic* and *median cephalic branches*, as shown in the right-hand specimen in Fig. 1090. Nearly, if not quite, as common is the arrangement shown in the middle specimen of that figure, in which the *median vein* deviates to the ulnar side of the forearm and joins the anterior ulnar vein, while the radial vein divides well below the elbow into an outer branch, the *cephalic vein*, and an inner branch, called by the author *vena mediana cubiti*, which runs inwards and upwards across the flexure of the elbow, receiving in its course the *deep median vein*, and uniting with the trunk formed by the confluence of the *median* and *ulnar veins* to form the *basilic vein*. This is one of the "intermediate forms" alluded to by Macalister (see note ³⁰⁷ above), and the **median vein of the elbow* in this arrangement is the representative of the *median basilic vein* in the arrangement usually described as normal. Sometimes, though the *median vein* divides in "normal" fashion into *median basilic* and *median cephalic branches*, still, an anastomotic branch, parallel with the *median basilic vein* and a little above it, passes across the front of the elbow from the *radial* or the *cephalic vein* to the *basilic vein*. This vein, when present, is called by the author **vena mediana cubiti accessoria*, the accessory median vein of the elbow (see Fig. 1087, p. 694, and Fig. 1089, p. 696).

³⁰⁹ (Fig. 1091, p. 698). Regarding the nomenclature of this terminal portion of the *subscapular artery*, see note ¹³⁶ above. The same considerations apply to the nomenclature of the companion vein.

³¹⁰ (Ibid.) This is the trunk formed by the union of the *anterior* and *posterior ulnar veins* (*anterior* and *posterior superficial ulnar veins*, according to Macalister). See note ³⁰⁶ above.

³¹¹ *Deep Median Vein* (Ibid.).—The author, in the original German edition of this work, calls the *deep median vein* "communicating branch between the [deep] radial veins and the superficial veins (*ramus anastomoticus*)."³¹¹ Macalister calls it *vena mediana profunda*.

³¹² *Perforating Arteries* (Fig. 1099, p. 705).—Usually the *perforating arteries* are four in number, the *first*, *second*, and *third*, or *superior*, *middle*, and *inferior perforating arteries*, being branches of the *deep femoral* or *profunda artery*, while the terminal portion of

the *profunda*, which perforates the adductor magnus muscle in series with the branches just mentioned, constitutes the *fourth perforating artery*. In the specimen shown in Fig. 1099, however, there are apparently three perforating arteries only, the terminal portion of the *deep femoral* or *profunda artery* constituting the *third* of the series. (This is the arrangement described as normal by Von Langer and Toldt.)

³¹³ **Femoropopliteal Vein* (Fig. 1102, p. 708).—"As the *external* or *short saphenous vein* enters the popliteal space, it is joined by an anastomotic cutaneous vein from the back of the thigh, **vena femoropoplitea*, which runs beside the small sciatic nerve for some distance, and communicates with the lowest *perforating vein*; finally the *external saphenous vein* enters the *popliteal vein*. Not infrequently, however, the **femoropopliteal vein* forms the true upward continuation of the *external saphenous vein*, so that the latter is connected with the popliteal vein only by a relatively small communicating branch, while it terminates in the *deep femoral* or *profunda vein* through the intermediation of the lowest *perforating vein*" (Von Langer and Toldt, *op. cit.*, pp. 552, 553). This *variety* is described by Quain (*op. cit.*, vol. ii., part ii., p. 539), but the name **femoropopliteal vein* is not used by this author. Another fairly common variety is an enlargement of the communicating branch between the *external* and the *internal saphenous veins*, so that the former vein empties itself chiefly or entirely into the latter.

³¹⁴ *Lumbar and Aortic Lymphatic Glands and Plexuses* (Fig. 1113, p. 718).—Quain does not speak of *aortic lymphatic glands* and *plexus*, but divides the *lumbar glands* into three groups, two *lateral* and one *median*, which correspond roughly with the *lumbar* and *aortic glands* respectively of Toldt. Macalister's terminology, however, resembles that of the German author, for according to the former (*op. cit.*, p. 432) the *lumbar lymphatic plexuses* "are

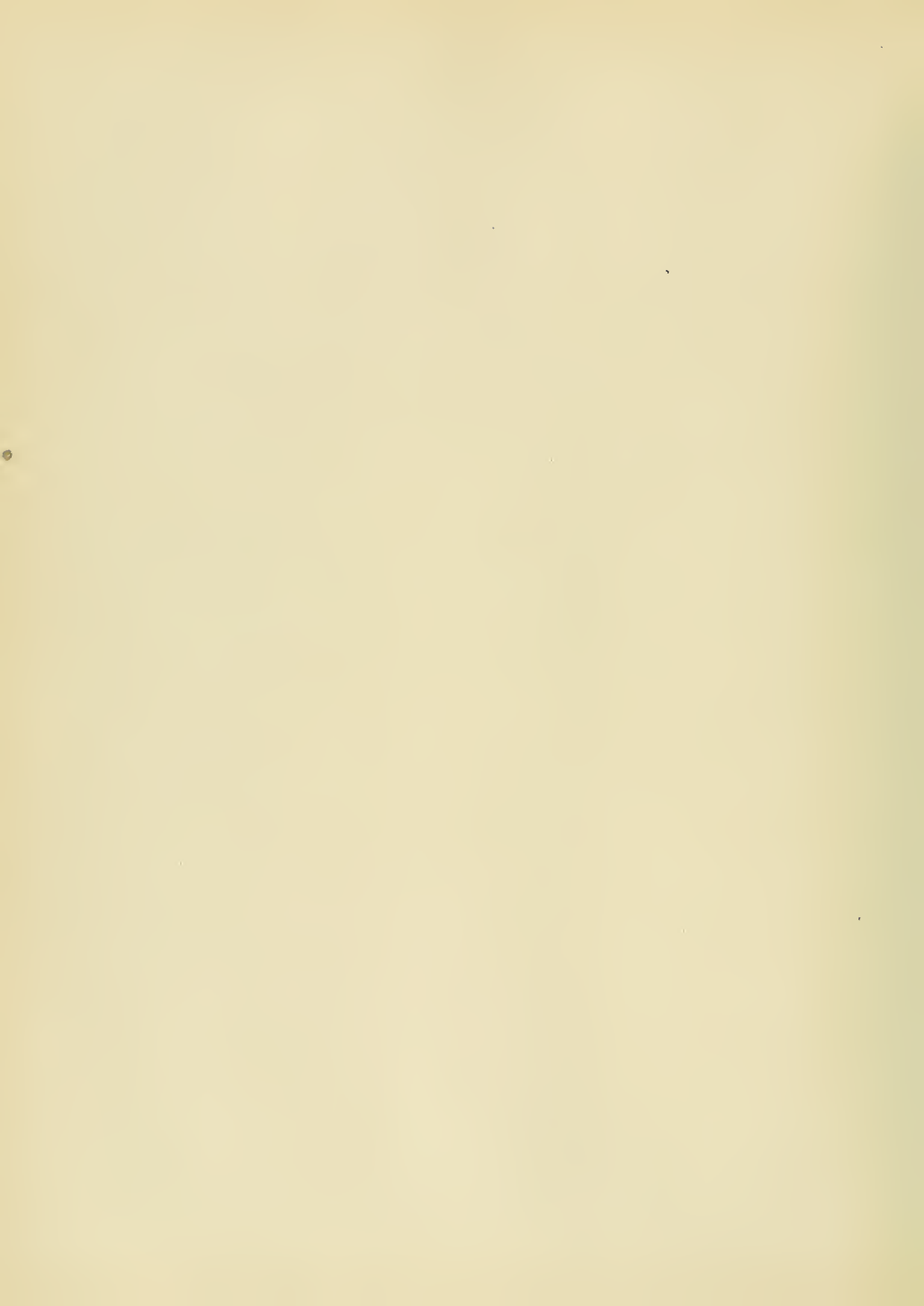
united across the aorta by a median *aortic lymphatic plexus*, with about six glands in its course."

³¹⁵ *Submaxillary and Suprahypoid or Submental Lymphatic Glands* (Fig. 1115, p. 720).—"The lymphatic glands situate along the lower border of the inferior maxillary bone and on the surface of the submaxillary (salivary) gland, known as *lymphoglandulæ submaxillares*, receive the lymphatic vessels from the face that run beside the facial vein, and also those from the lower gums, the floor of the mouth, and the isthmus of the fauces. One or two glands, situate between the anterior bellies of the digastric muscles, and known as *lymphoglandulæ submentales*, receive the lymphatic vessels of the chin" (Von Langer and Toldt, *op. cit.*, p. 566). The last-named are apparently identical with those called by Sappey the *suprahypoid glands*, one or two small glands "placed in the centre of the neck between the anterior bellies of the two digastric muscles, and connected with the lymphatics descending from the lower lip" (Quain, *op. cit.*, vol. ii., part ii., p. 558).

³¹⁶ (Fig. 1116, p. 721.) As the author recognises two *mediastina* only, *anterior* and *posterior* (see Appendix to Part IV., note ²⁴), the lymphatic glands called by him *lymphoglandulæ mediastinales anteriores* comprise the *superior mediastinal* or *cardiac lymphatic glands* in addition to the *anterior mediastinal lymphatic glands* of English authors (see also note ³ to p. 482, in Part IV.).

³¹⁷ *Anterior Auricular and Parotid Lymphatic Glands* (Ibid.).—Writing of the *parotid lymphatic glands*, Quain states (*op. cit.*, vol. ii., part ii., p. 558) that they are "three or four, of small size . . . beneath the parotid fascia, and . . . frequently more or less embedded in the substance of the parotid gland; one, larger than the others, is situated immediately in front of the tragus of the ear." It is thus evident that the glands called by Toldt *lymphoglandulæ auriculares anteriores* are included by Quain among the *parotid lymphatic glands*.

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INDEX

TO THE ANGEIOLOGY

Certain names in this Index have an asterisk (*) prefixed; these, as more fully explained in the Translator's Preface, being terms that form part of the English nomenclature used in this work, but which are not commonly employed by English anatomists. To other names a dagger (†) is prefixed; these are Latin names used by the author in the original work, but not included in the official nomenclature of the "Anatomische Gesellschaft." Abbreviation: App.=Appendix.

A.

- ADVENTITIA** (arterial tunic), see "Tunica"
Alcock's canal, 601-604, and App., note ¹⁴⁵
Anastomoses of the vaginal bulbs or bulbs of the vestibule with the vessels of the clitoris: arterial, 605, 607; venous, 675, 676
Anastomosis, crucial, App., note ²³⁰
 of veins, 560
Anatomy, topographical, see "Topographical anatomy"
Angeiology, general considerations, 555-560
†**Angulus venosus**, 585, 684, and App., note ¹²⁵
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 œsophageæ, 685
 † omphalomesentericæ, 578
 † ophthalmica inferior, 686, 687
 superior, 686, 687
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 ophthalmomeningea, 687
 ovarica, 676, 677
 palatina, 686, 689
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 pancreaticæ, 678
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 parotidæ anteriores, 682
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 tertia, 705, 707, 709
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 peronææ, 711
 pharyngææ, 685
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 mediales, 713
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 popliteæ, 711
 portæ, 580, 581, 594, 678
 ramus dexter, 580, 581
 sinister, 580, 581
 † posterior ventriculi sinistri, 563, 569, 584, 585
 † profunda brachii, 699
 femoris, 705, 707
 † profundæ linguæ, 686
 penis, 673
 † pudendæ externæ, 662, 671, 702, 705-707
 internæ, 672-677, 704
 pulmonales dextræ, 563, 565-567, 571, 573-575, 577, 580-584
 sinistræ, 563, 566-568, 571, 573-575, 577, 583-585
 radiales, 698, 700, 701

- † recurrens radialis, 700, 701
 † ulnaris, 700, 701
 Vena *vel* venæ:
 † recurrentes tibiales, 710
 renales, 579, 580, 662
 sacralis lateralis, 663, 672
 media, 663, 673, 678
 Salvatella, App., note 204
 saphena accessoria, 702, 724, 726
 magna, 640, 652, 655-660, 702, 703, 708, 712, 713, 724, 725
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 posteriores, 674, 704
 sigmoideæ, 678
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 † interna, 662, 673, 678
 spinales externæ anteriores, 691
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 stylomastoidea, 686
 subclavia, 579, 584, 683-685, 698
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 colli, 671
 † pectoris, 671
 † sublingualis, 686
 submental, 682-684
 subscapularis, 684
 † supra-orbitalis, 683, 684
 † suprarenalis, 662
 † suralis, lateralis, 711
 medialis, 711
 temporales profundæ, 688
 temporalis media, 682-684, 688, 689
 superficialis, 682-684
 testicularis, 662, 673
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 thoracodorsalis, 698
 thoraco-epigastrica, 671
 thynicæ, 662
 thyreoidæ ima, 582-584, 586, 662-664, 683, 685
 inferior, 685
 superior, 666, 683-686, 688, 689
 thyreoidæ inferiores, 585
 tibiales anteriores, 710, 712
 posteriores, 711, 713
 tracheales, 685
 transversa colli, 666, 683, 684, 698
 faciei, 682
 scapulæ, 682-685, 698
 † trunci, 661-679
 ulnares, 698, 700, 701
 umbilicalis, 578, 589, 581
 uterinæ, 677
 vertebralis, 626, 663, 667, 685, 686
 vorticosa, 687
 *Venous angle, 585, 684
 radicle, 558
 Ventricle (of the heart), left, 562, 566, 567, 569, 570, 573-577, 584, 586
 right, 562, 564, 565, 569, 570, 572, 574-577, 586
 primary, 577, 578
 Ventriculus (cordis) dexter, 562, 564, 565, 569, 570, 572, 574, 577, 586
 sinister, 562, 566, 567, 569, 570, 573-577, 584, 586
 Vessels, capillary, 558
 arterial, 558
 venous, 558
 of lymphatic glands, afferent, 716, 717
 efferent, 716, 717
 lymphatic, capillary, 559
 subcapillary, 559
 Villi, arachnoidal, 689 and App., note 206
 Vortex of the heart (vortex cordis), 576

AN ATLAS
OF
HUMAN ANATOMY
FOR STUDENTS AND PHYSICIANS

BY
CARL TOLDT, M.D.

ASSISTED BY
PROFESSOR ALOIS DALLA ROSA, M.D.

Adapted to English and American and International Terminology

BY
M. EDEN PAUL, M.D. BRUX., M.R.C.S., L.R.C.P.

SIXTH SECTION

G. NEUROLOGY

H. THE ORGANS OF THE SENSES

(FIGURES 1124 TO 1505 AND INDEX)

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NEUROLOGIA

NEUROLOGY

NEUROLOGY—GENERAL CONSIDERATIONS



FIG. 1124.—MEDULLATED NERVE FIBRES,³ FROM A PERIPHERAL NERVE TEASED OUT IN NORMAL SALT SOLUTION.

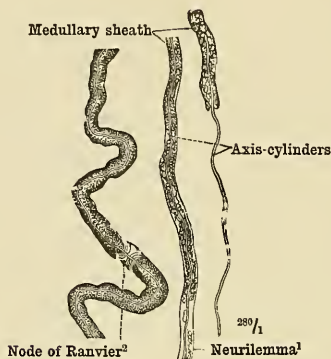


FIG. 1125.—MEDULLATED NERVE FIBRES³; THE AXIS-CYLINDER HAS BEEN RENDERED VISIBLE BY TREATMENT WITH MÜLLER'S FLUID.

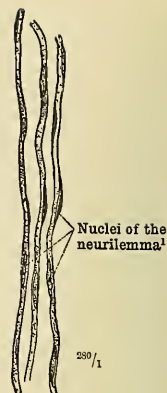


FIG. 1126.—NON-MEDULLATED NERVE FIBRES³ INVESTED WITH NEURILEMMA (see Appendix, note ³¹⁸), FROM THE CORD OF THE SYMPATHETIC NERVE.

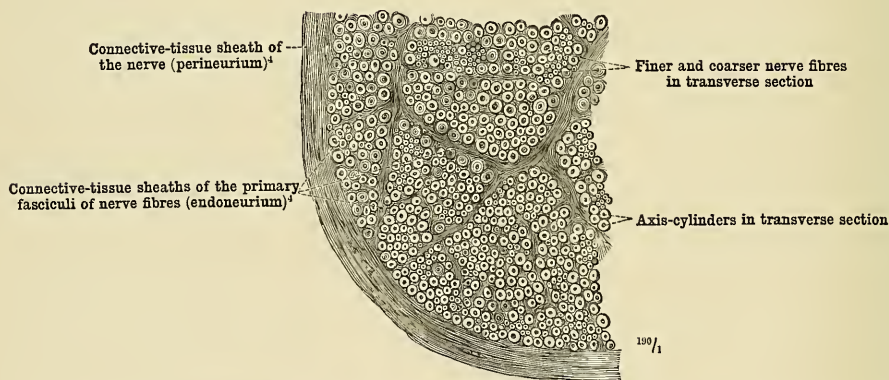


FIG. 1127.—TRANSVERSE SECTION OF A PORTION OF THE HUMAN MEDIAN NERVE. (See Appendix, conclusion of note ³²⁰.)

¹ See Appendix, note ³¹⁸.

² Quain gives *constriction* (of Ranvier) as an alternative name for the *node of Ranvier*, but the latter term is that in general use.—Tr.

³ See Appendix, note ³¹⁹.

⁴ See Appendix, note ³²⁰.

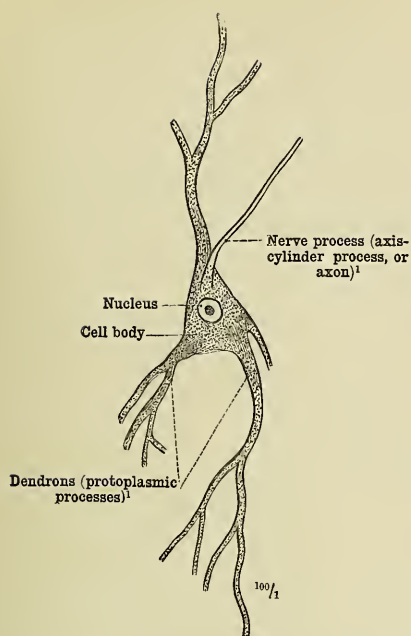


FIG. 1128.—MOTOR NERVE CELL FROM THE ANTERIOR COLUMN OF THE HUMAN SPINAL CORD.

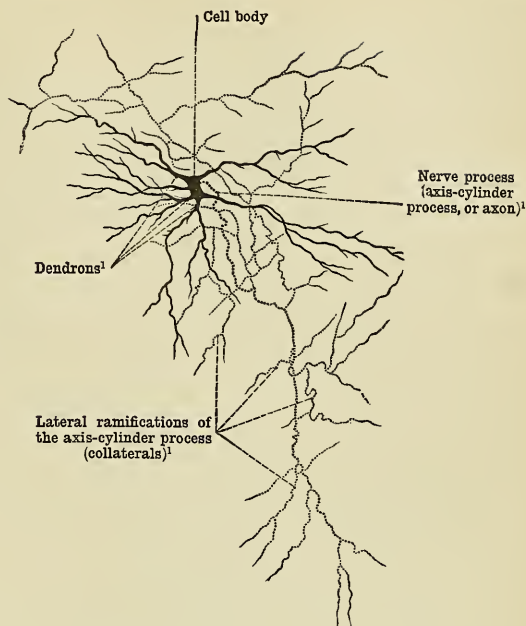


FIG. 1129.—TYPE OF SENSORY NERVE CELL (AFTER GOLGI).

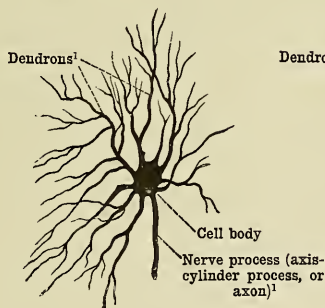


FIG. 1130.—GANGLION CELLS FROM THE SYMPATHETIC NERVOUS SYSTEM.

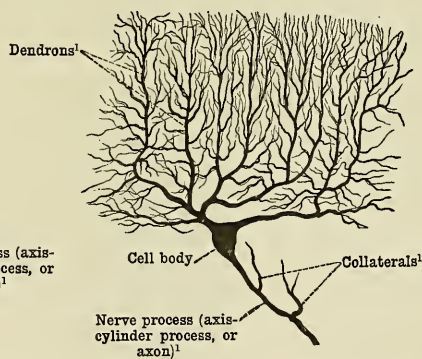


FIG. 1131.—CELL OR CORPUSCLE OF PURKINJE FROM THE HUMAN CEREBELLUM (AFTER GOLGI).

¹ See Appendix, note 321.

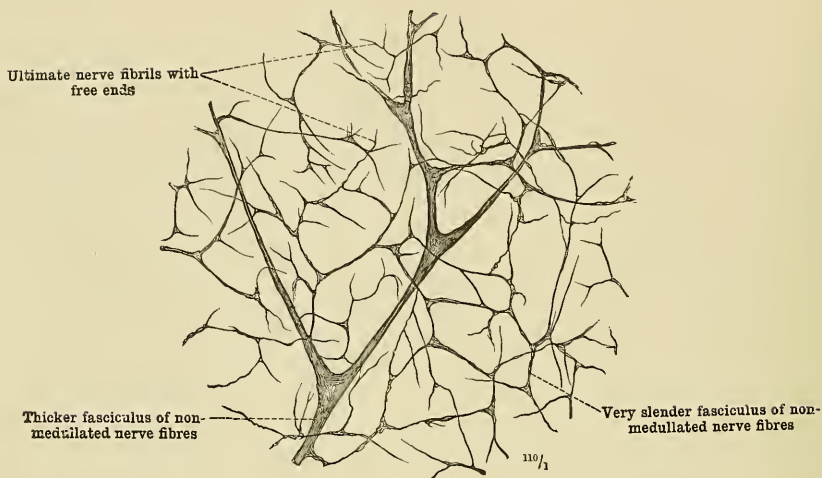


FIG. 1132.—NERVES OF THE CORNEA, STAINED WITH CHLORIDE OF GOLD. PERIPHERAL TERMINAL NETWORK¹ OF SENSORY NERVES WITH ULTIMATE FIBRILS ENDING FREELY. THE PLANE OF THE NETWORK IS PARALLEL WITH THE SURFACE OF THE CORNEA.

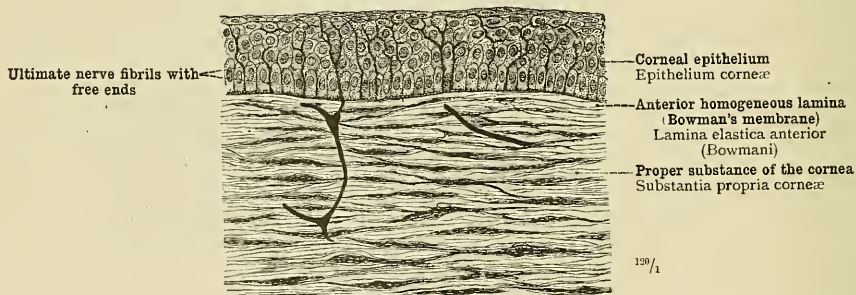


FIG. 1133.—NERVES OF THE CORNEA, STAINED WITH CHLORIDE OF GOLD. VERTICAL SECTION THROUGH THE ANTERIOR PORTION OF THE CORNEA. THE NERVE FIBRILS END FREELY IN THE EPITHELIUM.²

¹ See Appendix, note 322.

² See Appendix, note 324.

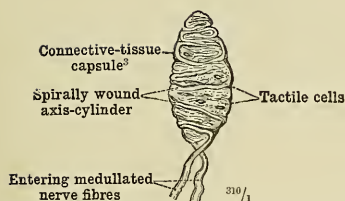


FIG. 1134.—TOUCH CORPUSCLE,¹ CORPUSCULUM TACTIS, FROM THE FINGER-TIP OF AN ADULT MAN.

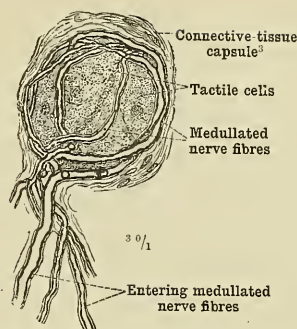


FIG. 1135.—SPHEROIDAL END-BULB OF KRAUSE, CORPUSCULUM BULBOIDEUM, FROM THE HUMAN CORNEA.

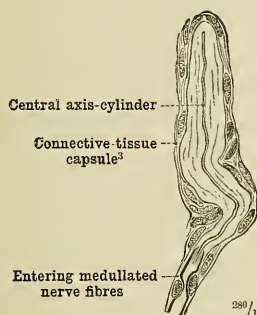


FIG. 1136.—CYLINDRICAL END-BULB FROM THE CONJUNCTIVA OF THE CALF.

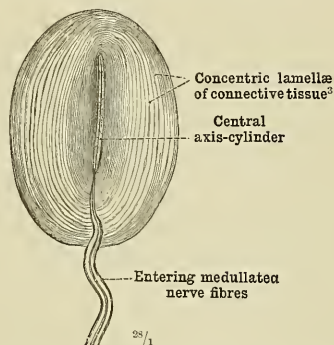


FIG. 1137.—PACINIAN CORPUSCLE,² CORPUSCULUM LAMELLOSUM, FROM THE MESOCOLON OF THE CAT.

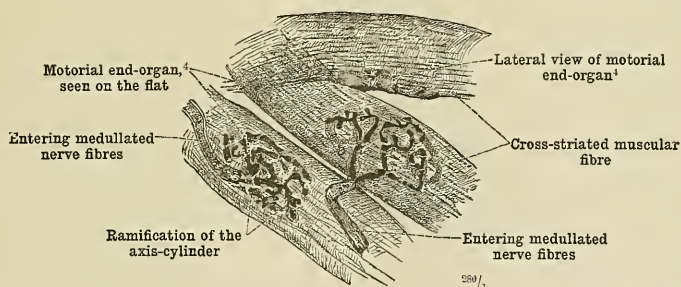


FIG. 1138.—TERMINATION OF MOTOR NERVE FIBRES IN CROSS-STRIATED MUSCULAR FIBRES.

¹ See Appendix, note 321.

² See Appendix, note 325.

³ See Appendix, note 326.

⁴ *Motorial End-Organ*.—The term *end-organ* is rightly preferred by Quain to the more familiar *end-plate*, this structure being, as the figure shows, not a continuous plate, but a flattened ramification.—T.F.

Terminal corpuscles of sensory nerves, *Corpuscula nervorum sensibilibus terminalia*.—
Motorial end-organs (end-plates). (See note ⁴ above.)

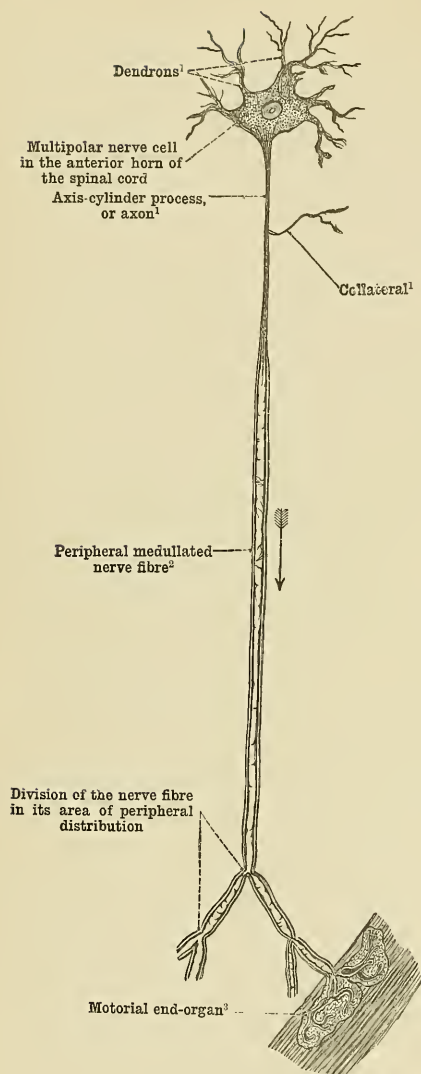


FIG. 1139.—DIAGRAMMATIC REPRESENTATION OF THE ORIGIN, COURSE, AND PERIPHERAL DISTRIBUTION OF A MOTOR NERVE FIBRE.

In both figures the arrows indicate the direction in which the nervous impulse passes.

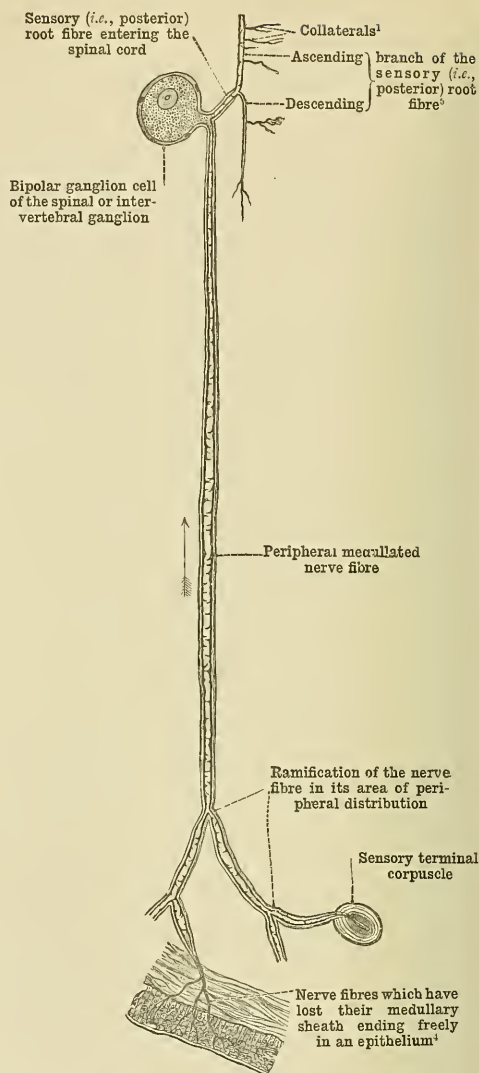


FIG. 1140.—DIAGRAMMATIC REPRESENTATION OF THE ORIGIN, COURSE, AND PERIPHERAL DISTRIBUTION OF A SENSORY NERVE FIBRE.

¹ See Appendix, note 3rd.

² See Appendix, note 3rd.

³ See note 4 to p. 749.

⁴ See Appendix, note 3rd.

⁵ See note 9 to p. 755.

Origin and Termination of Nerve Fibres.

SYSTEMA NERVORUM
CENTRALE

THE
CENTRAL NERVOUS SYSTEM

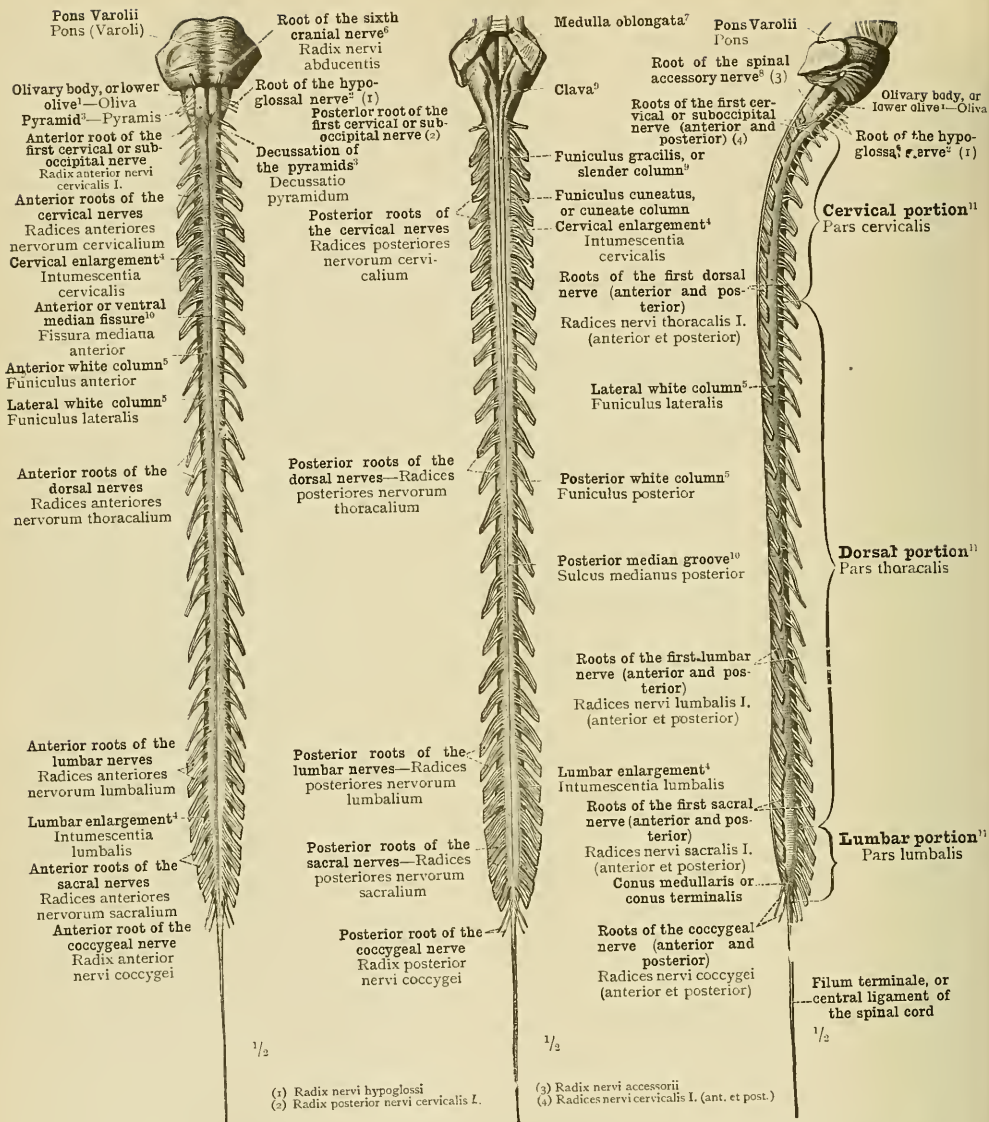


FIG. 1141.—SEEN FROM BEFORE.

FIG. 1142.—SEEN FROM BEHIND.

FIG. 1143.—SEEN FROM THE RIGHT SIDE.

¹ See Appendix, note 377.² Twelfth cranial nerve in Soemmerring's enumeration, ninth in that of Willis; sometimes also known as the *lingual motor nerve*.³ See Appendix, note 378.⁴ See Appendix, note 379.⁵ See Appendix, note 380.⁶ See Appendix, note 381.⁷ Known also as the *abducent ocular nerve*.⁸ Twelfth cranial nerve in Soemmerring's enumeration, accessory portion of the eighth cranial nerve in that of Willis.⁹ The *funiculi graciles* with their *clavae* are sometimes described as the *posterior pyramids*.¹⁰ See Appendix, note 382.¹¹ See Appendix, note 383.

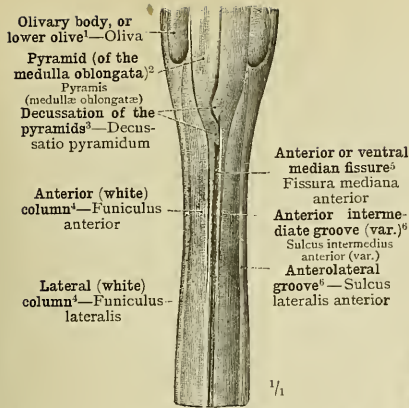


FIG. 1144.—THE CERVICAL PORTION OF THE SPINAL CORD, PARS CERVICALIS MEDULLÆ SPINALIS (see *Appendix, note 333*), WITH THE ADJOINING PORTION OF THE MEDULLA OBLONGATA, SEEN FROM BEFORE.

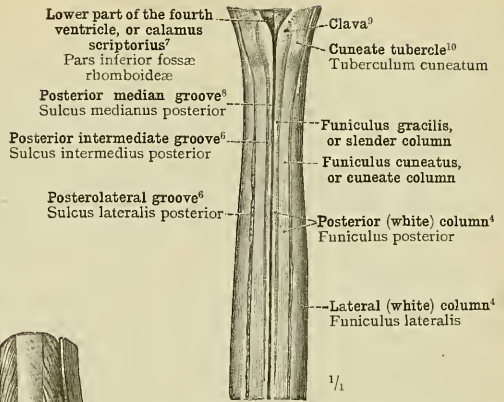


FIG. 1145.—THE CERVICAL PORTION OF THE SPINAL CORD, PARS CERVICALIS MEDULLÆ SPINALIS (see *Appendix, note 333*), WITH THE ADJOINING PORTION OF THE MEDULLA OBLONGATA, SEEN FROM BEHIND.

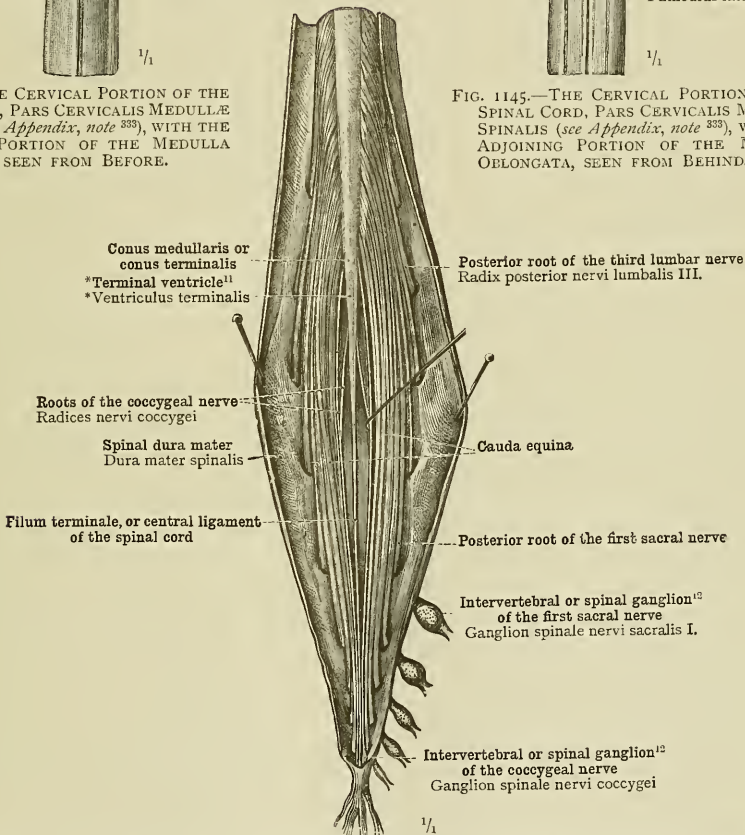


FIG. 1146.—THE LUMBAR PORTION OF THE SPINAL CORD, PARS LUMBALIS MEDULLÆ SPINALIS (see *Appendix, note 333*), WITH THE CONUS MEDULLARIS (OR CONUS TERMINALIS), THE FILUM TERMINALE (OR CENTRAL LIGAMENT OF THE SPINAL CORD), AND THE CAUDA EQUINA. SEEN FROM BEHIND.

¹ See *Appendix, note 327*.

² The words *medulla oblongata* are added to distinguish the pyramid of the medulla oblongata from the pyramid vermis, the pyramid of the lower worm of the cerebellum. See also *Appendix, note 328*.

³ See *Appendix, note 328*.

⁴ See *Appendix, note 329*.

⁵ See *Appendix, note 332*.

⁶ See *Appendix, note 335*.

⁷ See *Appendix, note 334*.

⁸ See *Appendix, note 334*.

⁹ See *note 9* to p. 752.

¹⁰ See *Appendix, note 337*.

¹¹ See *Appendix, note 338*.

¹² Also called the ganglion of the posterior root.

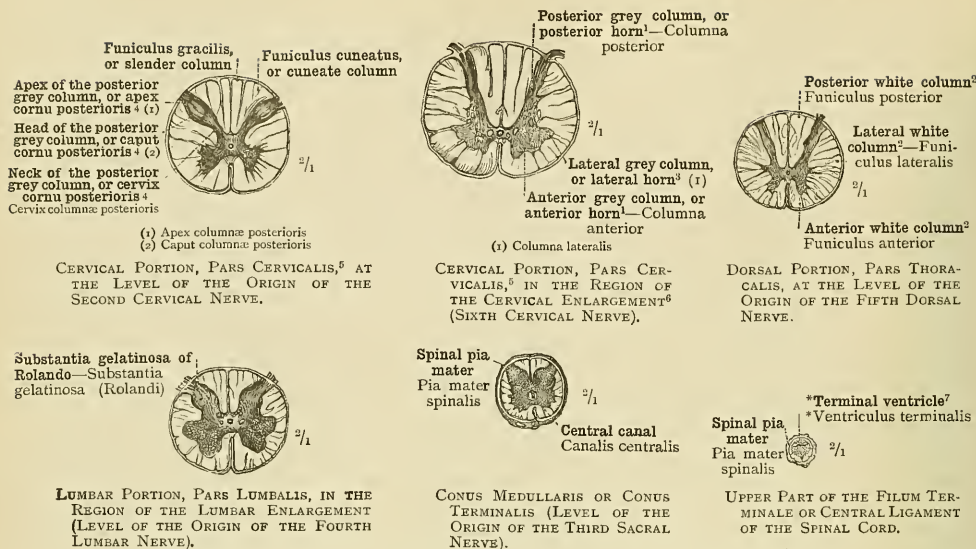
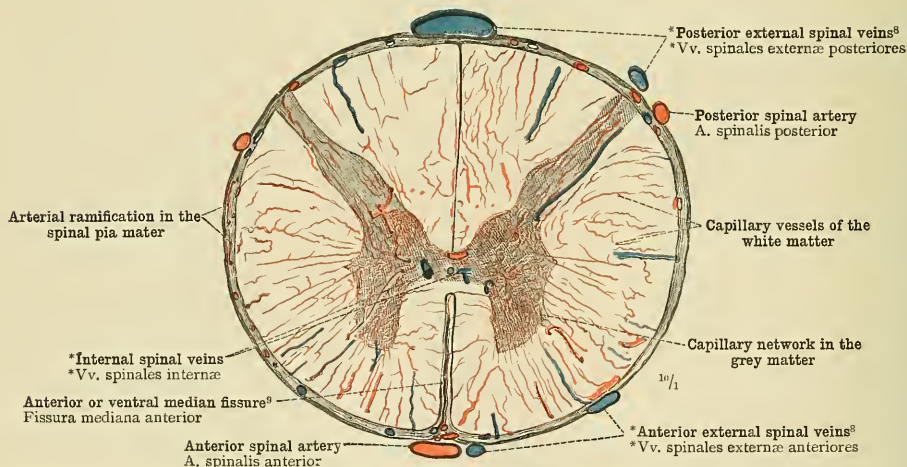


FIG. 1147.—TRANSVERSE SECTIONS OF THE SPINAL CORD OF AN ADULT MAN.

FIG. 1148.—THE BLOOD-SUPPLY OF THE SPINAL CORD. TRANSVERSE SECTION THROUGH THE LOWER END OF THE DORSAL PORTION (PARS THORACALIS)⁵.¹ See Appendix, note 339.² See Appendix, note 339.³ Better known as the *intermediolateral tract* of Lockhart Clarke (*intermediate process* of Gowers). Regarding the use of the term *lateral grey column*, see Appendix, note 339.⁴ The *posterior horn* consists of three parts: the *cervix*, the narrow base; the *caput*, the thickened main portion; and the *apex*, the thin posterior extremity just beneath the posterolateral groove. Regarding the use of the term *posterior grey column*, see Appendix, note 339.⁵ See Appendix, note 333.⁶ See Appendix, note 339.⁷ See Appendix, note 338.⁸ See Appendix, note 340.⁹ See Appendix, note 338.

Medulla spinalis—The spinal cord (see Appendix, note 334).

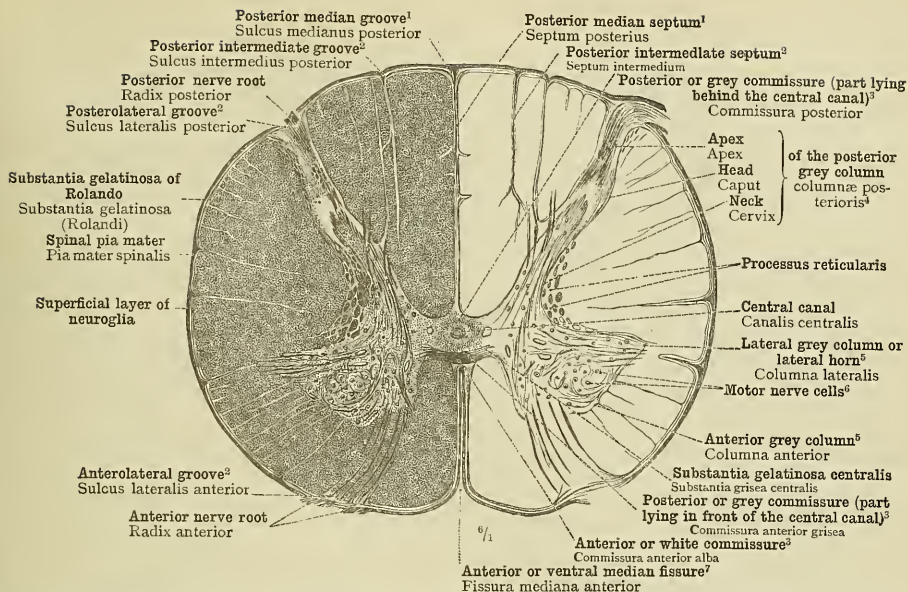


FIG. 1149.—TRANSVERSE SECTION THROUGH THE CERVICAL ENLARGEMENT, INTUMESCENCIA CERVICALIS,⁸ OF THE SPINAL CORD, AT THE LEVEL OF THE EMERGENCE OF THE ROOTS OF THE SIXTH CERVICAL NERVE.

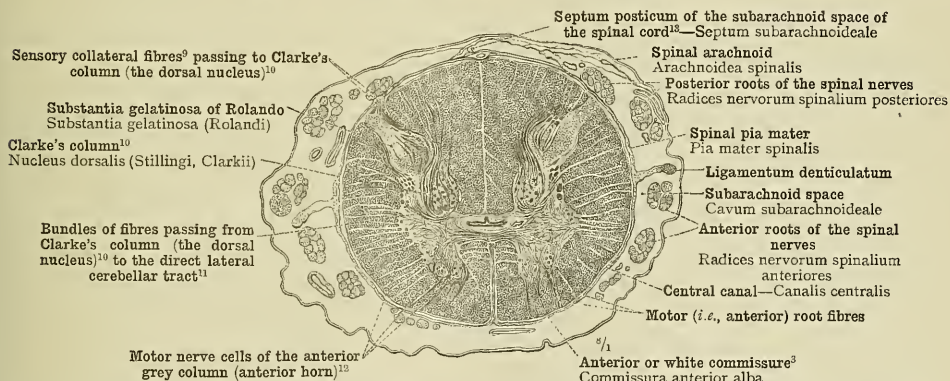


FIG. 1150.—TRANSVERSE SECTION THROUGH THE UPPERMOST PART OF THE LUMBAR PORTION OF THE SPINAL CORD (see *Appendix*, note 333), WITH THE PIA MATER AND THE ARACHNOID. THE POSTERIOR VESICULAR COLUMN OF LOCKHART CLARKE, OR DORSAL NUCLEUS, NUCLEUS DORSALIS.¹⁰ FROM A CHILD AGED THREE YEARS.

¹ See *Appendix*, note 332.

² See *Appendix*, note 335.

³ See *Appendix*, note 344.

⁴ Or *apex cornu posterioris*, and *cervix cornu posterioris*. See also note 4 to p. 754.

⁵ See *Appendix*, note 336.

⁶ Constituting the *motor cell column* or *cell column of the anterior horn*.

⁷ See *Appendix*, note 332.

⁸ See *Appendix*, note 339.

⁹ See *Appendix*, note 344.

¹⁰ See *Appendix*, note 343.

¹¹ See *Appendix*, note 344.

¹² These cells make up what Quain terms the *motor cell column* or the *cell column of the anterior horn*. Regarding the use of the term *anterior grey column* for the *anterior horn*, see *Appendix*, note 339.

¹³ See *Appendix*, note 345.

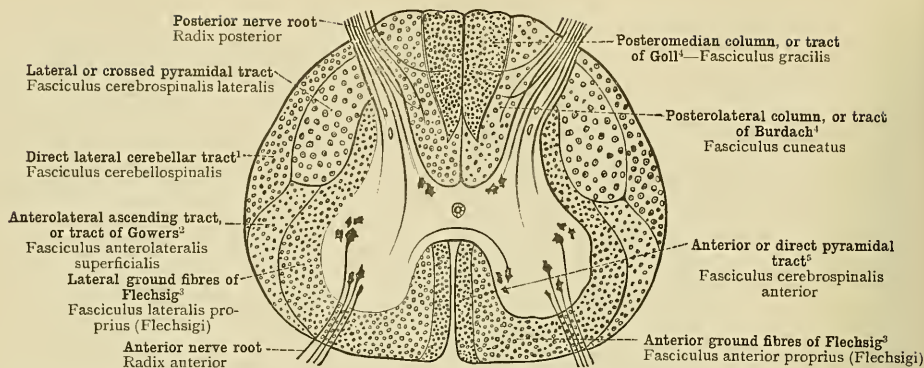


FIG. 1151.—DIAGRAMMATIC REPRESENTATION OF THE CONDUCTING SYSTEMS (CONDUCTING TRACTS) IN THE WHITE SUBSTANCE OF THE SPINAL CORD; AS SEEN IN A SECTION THROUGH THE LOWER EXTREMITY OF THE CERVICAL PORTION OF THE CORD (see Appendix, note 333).

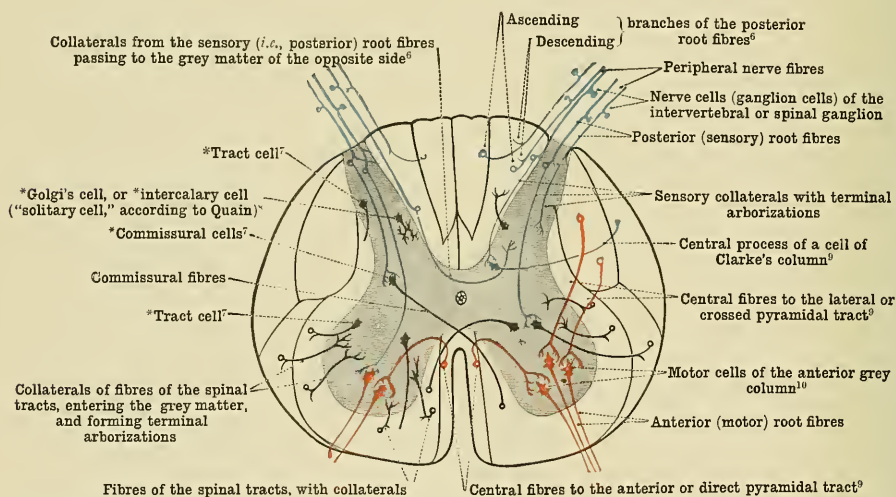


FIG. 1152.—DIAGRAMMATIC REPRESENTATION OF THE COURSE OF THE FIBRES OF THE SPINAL CORD, AS SEEN IN A SECTION THROUGH THE LOWER END OF THE CERVICAL PORTION OF THE CORD (see Appendix, note 333).

¹ See Appendix, note 344.

² See Appendix, note 346.

³ See Appendix, note 347.

⁴ See Appendix, note 348.

⁵ Known also as the *column* or *tract of Tüsch*.

⁶ See Appendix, note 349.

⁷ See Appendix, note 349.

⁸ See Appendix, note 350.

⁹ See Appendix, note 351.

¹⁰ See Appendix, note 339.

Decursus fibrarum spinalium—Course of the fibres of the spinal cord.

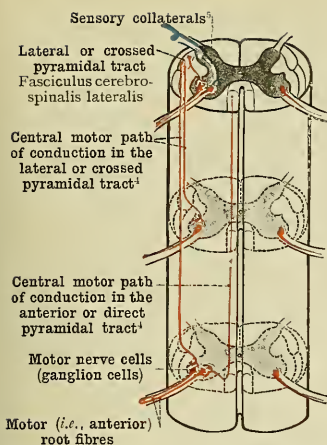


FIG. 1153.—DIAGRAMMATIC REPRESENTATION OF THE CENTRAL¹ MOTOR PATHS OF CONDUCTION IN THE SPINAL CORD. SEEN FROM BEFORE.

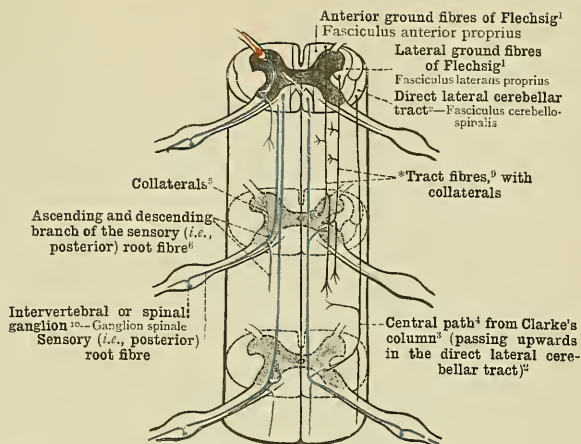


FIG. 1154.—DIAGRAMMATIC REPRESENTATION OF THE CENTRAL¹ SENSORY PATHS OF CONDUCTION IN THE SPINAL CORD. SEEN FROM BEHIND.

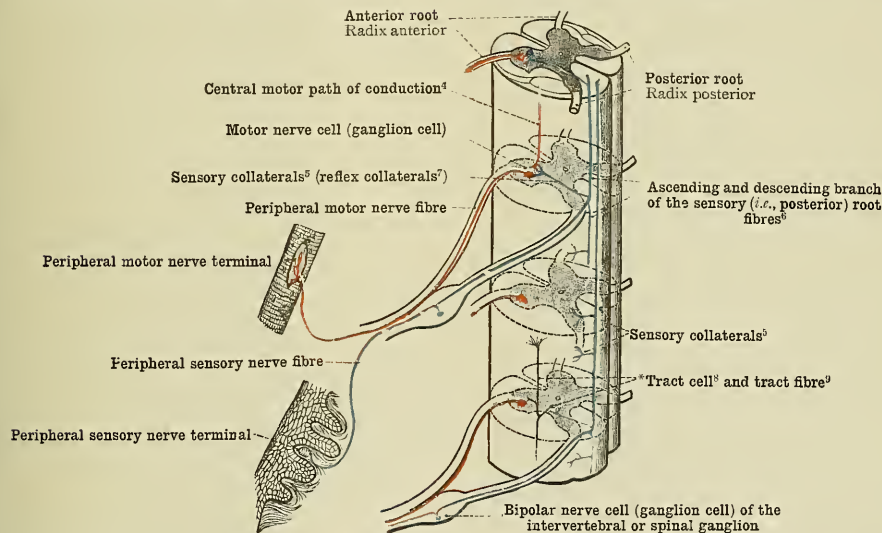


FIG. 1155.—DIAGRAMMATIC REPRESENTATION OF THE MOTOR AND SENSORY PATHS OF CONDUCTION, AND OF THE REFLEX ARCS OF THE SPINAL CORD.

¹ See Appendix, note 342.

² See Appendix, note 344.

³ See note 3 to p. 754.

⁴ Regarding the significance of the term *central* in these instances, see Appendix, note 351.

⁵ See Appendix, note 351.

⁶ See Appendix, note 342.

⁷ See Appendix, note 352.

⁸ See Appendix, note 349.

⁹ *Tract Fibre*.—The author uses the term *tract fibre* (*Strangfaser*) as an abbreviation for *fibre of one of the tracts of the white matter of the spinal cord*.

¹⁰ Also called the ganglion of the posterior root.

Decursus fibrarum spinalium—Course of the fibres of the spinal cord.

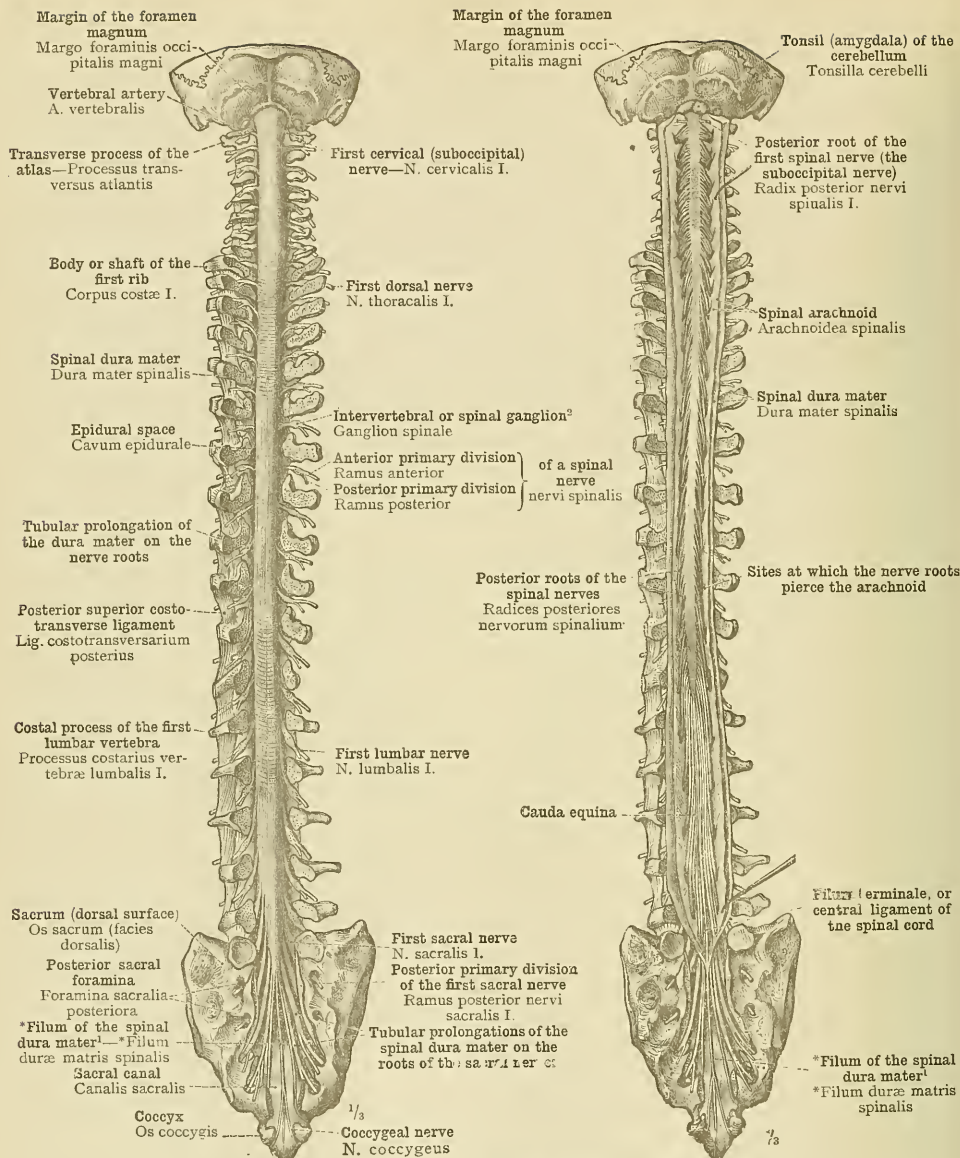
¹ See Appendix, note 353.² Also called the *ganglion of the posterior root*.

FIG. 1156.—THE SPINAL DURA MATER, DURA MATER SPINALIS, UNOPENED. SEEN FROM BEHIND.

FIG. 1157.—THE SPINAL DURA MATER, DURA MATER SPINALIS, AND THE SPINAL ARACHNOID, ARACHNOIDEA SPINALIS, BOTH OPENED FROM BEHIND.

Meninges spinales—The membranes of the spinal cord.

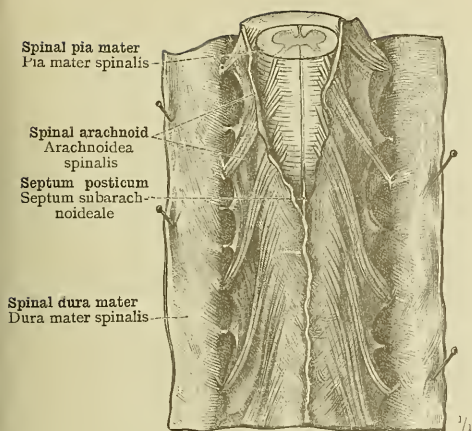


FIG. 1158.—THE SPINAL ARACHNOID, ARACHNOIDEA SPINALIS, EXPOSED IN PART OF THE CERVICAL PORTION OF THE SPINAL CORD¹ BY INCISING THE DURA MATER FROM BEHIND.

In the upper part of the preparation the arachnoid has been divided in the median line and the margins of the incision have been drawn apart.

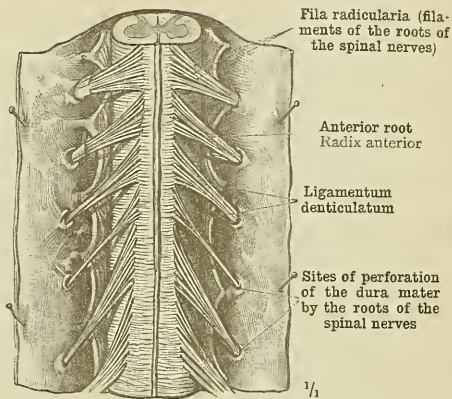


FIG. 1159.—THE LIGAMENTUM DENTICULATUM, WHICH SUPPORTS THE SPINAL CORD WITHIN THE THECA VERTEBRALIS, AS SEEN IN PART OF THE CERVICAL PORTION OF THE CORD,¹ AFTER THE DURA MATER HAS BEEN INCISED FROM BEFORE, AND THE ARACHNOID REMOVED FROM THE FRONT OF THE CORD.

¹ See Appendix, note 333.

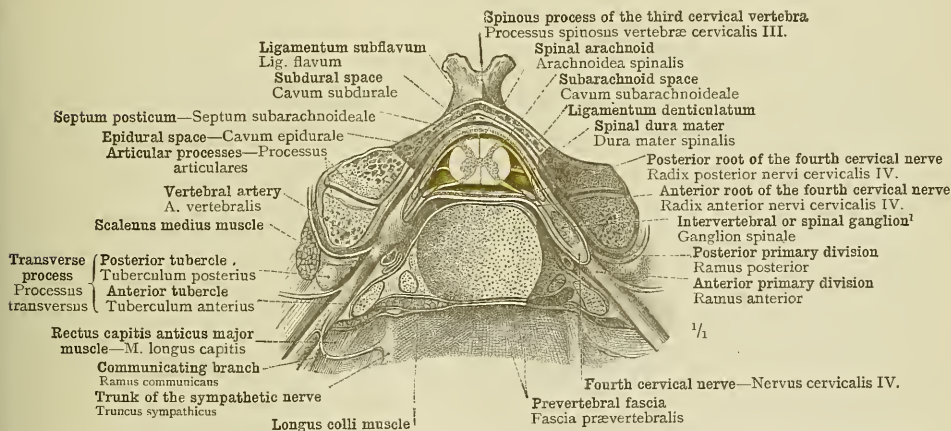


FIG. 1160.—TRANSVERSE SECTION THROUGH THE INTERVERTEBRAL DISC BETWEEN THE THIRD AND FOURTH CERVICAL VERTEBRÆ. THE MEMBRANES OF THE SPINAL CORD ARE SEEN IN TRANSVERSE SECTION, AND THEIR RELATION TO THE EMERGING SPINAL NERVE ROOTS IS DISPLAYED.

The subarachnoid space is printed yellow; the subdural space, blue; and the epidural space, black.

¹ Also called the ganglion of the posterior root.

Meninges spinales—The membranes of spinal cord.

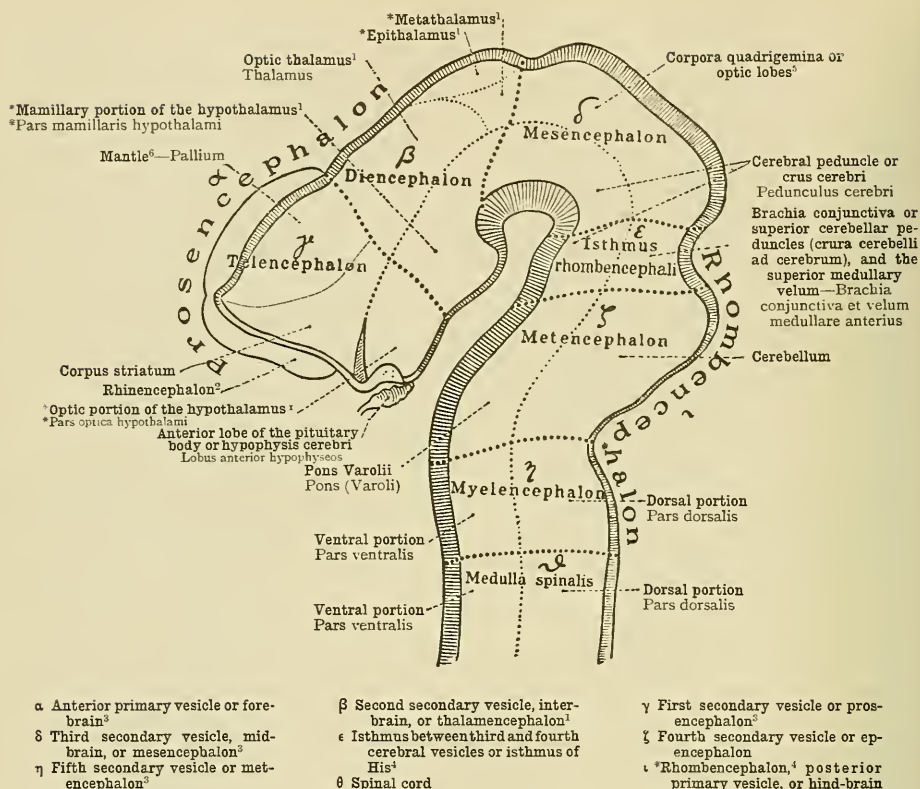


FIG. 1161.—MEDIAN SAGITTAL SECTION THROUGH THE BRAIN OF A HUMAN EMBRYO AT THE END OF THE FIRST MONTH OF INTRA-UTERINE LIFE (MONTH OF FOUR WEEKS ONLY). DIAGRAMMATIC. AFTER W. HIS.

¹ See Appendix, note 354.

² Rhinencephalon.—A name sometimes given to the combined *olfactory* and *limbic lobes*.

³ Some confusion is inevitable owing to the fact that the names given to the parts of the developing brain are used differently by Quain and by Von Langer and Toldt. The exact significance of the English renderings to the above diagram will be found in Quain's "Anatomy," vol. i., part i., p. 61. Here it is sufficient to indicate that—(1) the term *prosencephalon* is used by the German authors to denote the *anterior primary vesicle* or *fore-brain* as a whole, but by Quain to denote the *first secondary vesicle* only (called by Toldt *telencephalon*); (2) as the *middle primary vesicle* produces *one secondary vesicle* only (the *fourth*), the terms *mid-brain* and *mesencephalon* may be applied to this indifferently; (3) the term *epencephalon*, as used by Quain, appears to denote the combined *isthmus rhombencephali* and *metencephalon* of the German authors; and (4) the term *metencephalon*, as used by Quain, denotes what Von Langer and Toldt call the *myelencephalon*.

⁴ For the exact significance of the term *rhombencephalon* as used by the author, see Appendix, notes 355 and 369.

⁵ *Optic Lobes*.—This name is given by Macalister to the structures which nearly all other English anatomists agree in calling the *corpora quadrigemina*. The fact that the *corpora quadrigemina* of the mammalian brain are the homologues of the *corpora bigemina* or *optic lobes* of the avian brain does not seem an adequate reason for discarding an apt and well-established name.

⁶ *Mantle* or *Pallium*.—"The basal ganglia of the brain, together with the crura cerebri, pons, and medulla, are often distinguished as the *stem* of the brain [*caudex cerebri*, Ger. *Hirnstamm*] from the superimposed hemispheres, which are known as the *mantle* of the brain [*pallium*, Ger. *Hirnmantel*]" (Von Langer and Toldt, *op. cit.*, pp. 600, 601). Writing of the *first secondary vesicle* (*prosencephalon*), Quain (*op. cit.*, vol. iii., part i., pp. 69, 70) says: "The original vesicle is relatively small, although its lateral outgrowths form by far the largest portions of the brain in higher vertebrates. The *corpora striata* appear as thickening of the floor of the hemisphere vesicles, and outside them the grey and white matter of the island of Reil becomes differentiated. The rest of the wall of the hemisphere vesicle (*mantle* of Reichert) eventually thickens to form the whole of the grey and white matter of the hemispheres."

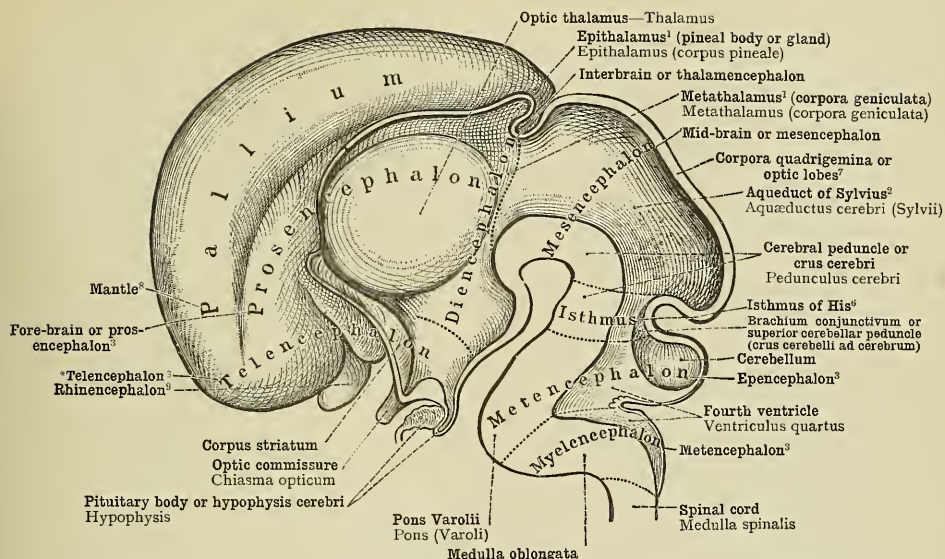


FIG. 1162.—MEDIAN SAGITTAL SECTION THROUGH THE BRAIN OF A HUMAN EMBRYO IN THE THIRD MONTH OF INTRA-UTERINE LIFE (MONTHS OF FOUR WEEKS EACH). AFTER W. HIS.

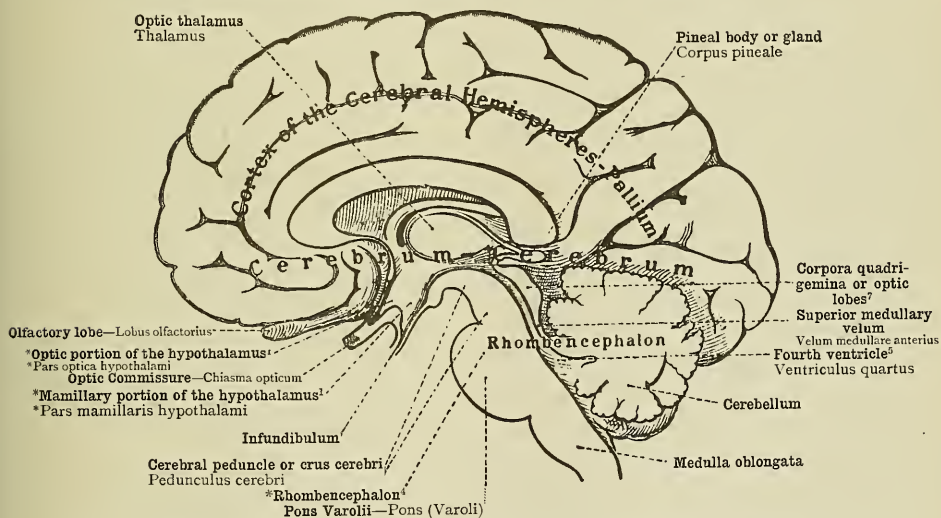


FIG. 1163.—MEDIAN SAGITTAL SECTION THROUGH THE ADULT HUMAN BRAIN. AFTER W. HIS.

¹ See Appendix, note 354.

⁴ See Appendix, note 355.

⁶ Isthmus of His.—This is the constriction between the third and fourth secondary vesicles. See Appendix, note 359.

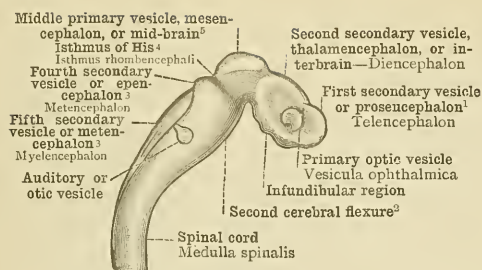
⁷ See note 5 to p. 760.

² Or iter a tertio ad quartum ventriculum.

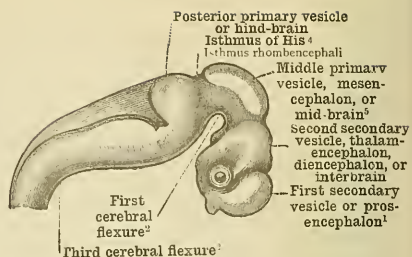
³ Sometimes called *fossa rhomboidalis*. See also Appendix, note 355.

⁴ See note 5 to p. 760.

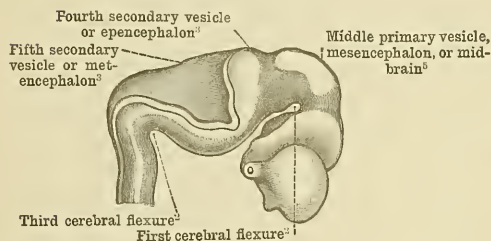
⁵ See note 2 to p. 760.



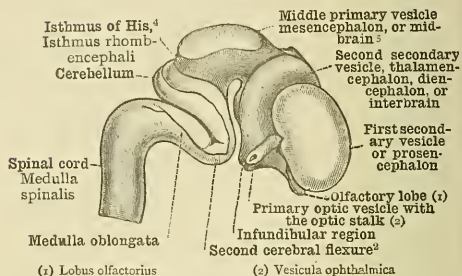
THIRD WEEK.



FOURTH WEEK.



FIFTH WEEK.



EIGHTH WEEK.

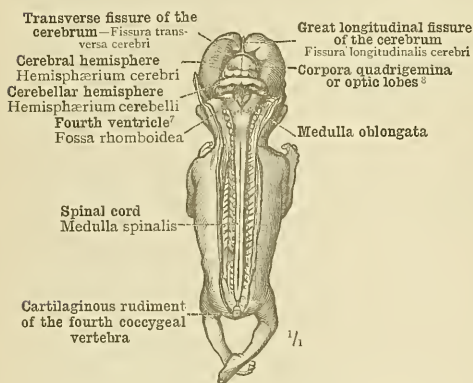
FIG. 1164.—RECONSTRUCTED FIGURES⁶ OF THE RUDIMENTARY BRAIN OF HUMAN EMBRYOS. AFTER W. HIS.

FIG. 1165.—BRAIN AND SPINAL CORD OF A HUMAN EMBRYO AT THE END OF THE THIRD MONTH OF INTRA-UTERINE LIFE (MONTHS OF FOUR WEEKS EACH), SEEN FROM BEHIND.

Body-length, 6½ centimetres (2¼ inches).

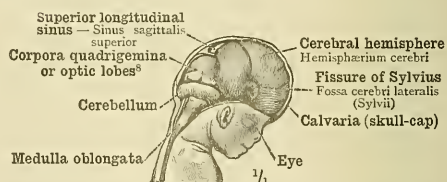


FIG. 1166.—BRAIN OF THE EMBRYO SHOWN IN FIG. 1165, SEEN IN THIS CASE FROM THE RIGHT SIDE.

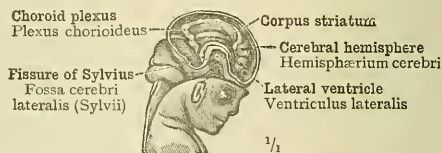


FIG. 1167.—INTERIOR OF THE RIGHT CEREBRAL HEMISPHERE, AS SEEN AFTER REMOVING THE CALVARIA (SKULL-CAP) AND THE CONVEX WALL OF THE CEREBRUM, IN THE EMBRYO SHOWN IN FIG. 1165.

¹ Telencephalon, according to Toldt. See note 3 to p. 760.⁴ Isthmus of His.—This is the constriction between the third and fourth secondary vesicles. See Appendix, note 35.⁵ See Appendix, note 35.⁶ By the term *reconstructed figures* (Constructionsbilder) is meant that these profile figures have been reconstructed from sections.⁷ See Appendix, note 35.⁸ See note 5 to p. 760.² See Appendix, note 35.³ See Appendix, note 35.³ See Appendix, note 35.

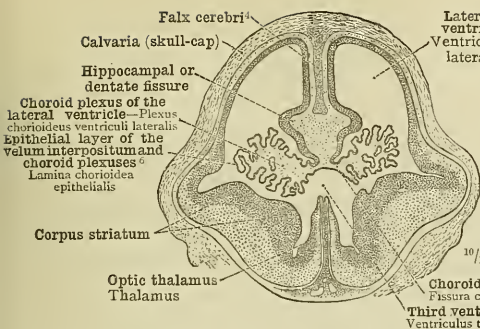


FIG. 1168.—CORONAL SECTION THROUGH THE HEAD, PASSING BETWEEN THE FRONTAL AND PARIETAL LOBES OF THE BRAIN; FROM A HUMAN EMBRYO EIGHT WEEKS OLD.

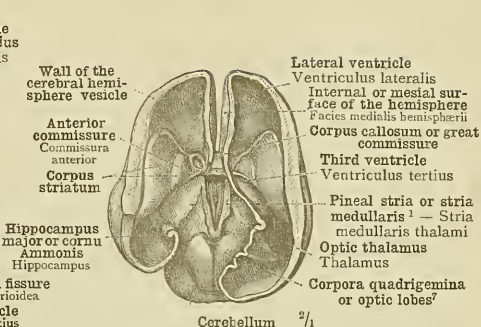


FIG. 1169.—THE INTERIOR OF THE CEREBRAL HEMI-SPHERE VESICLES OF A HUMAN EMBRYO AT THE END OF THE FOURTH MONTH (MONTHS OF FOUR WEEKS EACH), HAVING A BODY-LENGTH OF 1·8 CENTIMETRES (4·65 INCHES). SEEN FROM ABOVE.

The cerebral hemisphere vesicles were opened by the removal of their convex summits.

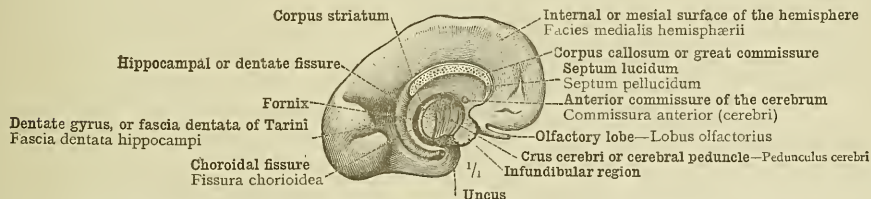


FIG. 1170.—LEFT CEREBRAL HEMISPHERE OF A HUMAN FÆTUS IN THE MIDDLE OF THE SIXTH MONTH (MONTHS OF FOUR WEEKS EACH), HAVING A BODY-LENGTH OF 25 CENTIMETRES (9·84 INCHES). SEEN FROM THE INNER SIDE.

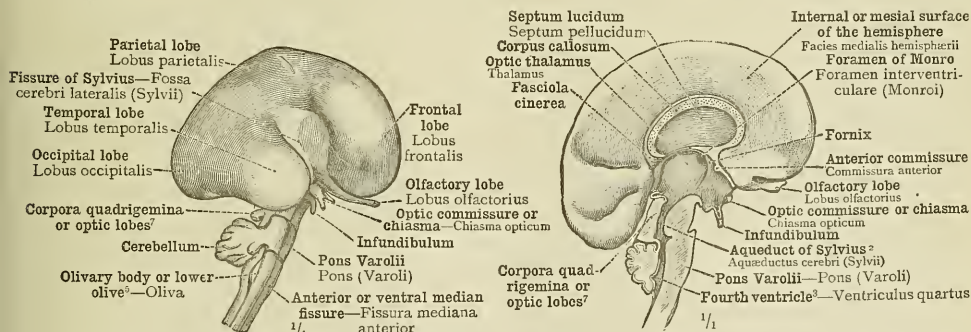


FIG. 1171.—BRAIN OF A HUMAN FÆTUS IN THE MIDDLE OF THE SIXTH MONTH (MONTHS OF FOUR WEEKS EACH), HAVING A BODY-LENGTH OF 25 CENTIMETRES (9·84 INCHES). THE OUTER OR CONVEX SURFACE OF THE RIGHT HEMISPHERE.

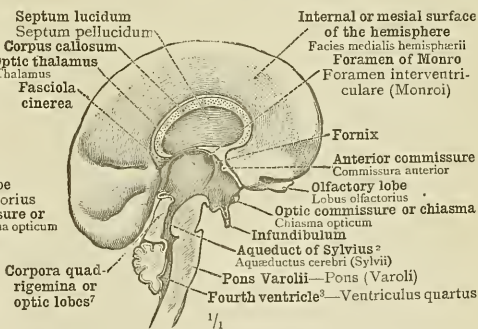


FIG. 1172.—MEDIAN SAGITTAL SECTION THROUGH THE BRAIN OF A HUMAN FÆTUS IN THE END OF THE SIXTH MONTH (MONTHS OF FOUR WEEKS EACH), HAVING A BODY-LENGTH OF 29 CENTIMETRES (11·42 INCHES). INNER OR MESIAL SURFACE OF THE LEFT HEMISPHERE.

¹ See Appendix, note 399.

⁴ Sometimes distinguished by the name of *falcis major* from the *falcis minor* or *falcis cerebelli*.

⁵ See Appendix, note 397.

³ Or *iter a tertio ad quartum ventriculum*.

⁶ See note 9 to p. 767.

⁷ See Appendix, note 355.

⁷ See note 3 to p. 760.

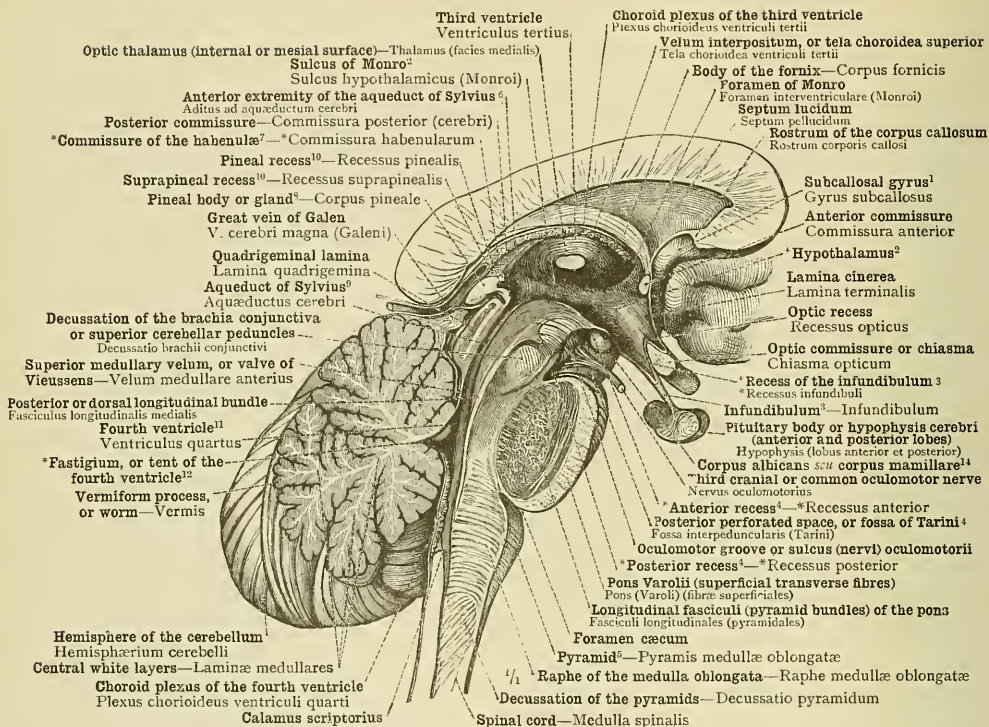


FIG. 1173.—PART OF A MEDIAN SAGITTAL SECTION THROUGH THE BRAIN. LEFT HALF. THE CONSTITUENTS OF THE *RHOMBENCEPHALON (see Appendix, note ³⁵⁵): THE MEDULLA OBLONGATA, THE PONS VAROLII, AND THE CEREBELLUM. THE CONSTITUENTS OF THE MESENCEPHALON OR MID-BRAIN: THE QUADRIGEMINAL BODIES OR OPTIC LOBES (CORPORA QUADRIGEMINA—see note ⁵ to p. 760), AND THE CEREBRAL PEDUNCLES OR CRURA CEREBRI (PEDUNCULI CEREBRI). THE CONSTITUENTS OF THE THALAMENCEPHALON OR INTERBRAIN (*Diencephalon—see Appendix, note ³⁵⁴): THE OPTIC THALAMI AND THE HYPOTHALAMUS² WITH THE PITUITARY BODY, OR HYPOPHYSIS CEREBRI, AND THE PINEAL BODY OR GLAND, OR EPIPHYSIS CEREBRI—THE LAST-NAMED BEING COVERED BY THE CORPUS CALLOSUM OR GREAT COMMISSURE AND BY THE FORNIX. THE THIRD AND FOURTH VENTRICLES (VENTRICULI TERTIUS ET QUARTUS), CONNECTED BY THE AQUEDUCT OF SYLVIOUS OR ITER A TERTIO AD QUARTUM VENTRICULUM (AQUEDUCTUS CEREBRI), AND CLOSED IN BY THE CHOROID PLEXUSES OF THE THIRD AND FOURTH VENTRICLES RESPECTIVELY (PLEXUS CHORIOIDEI VENTRICULI TERTII ET QUARTI). THE COMMISSURES OF THE CEREBRUM,¹³ ANTERIOR AND POSTERIOR (COMMISSURA ANTERIOR ET COMMISSURA POSTERIOR CEREBRI), ARE CUT ACROSS IN THE MEDIAN PLANE. ON THE INTERNAL OR MESIAL SURFACE OF THE OPTIC THALAMUS THE MIDDLE OR SOFT COMMISSURE (MASSA INTERMEDIA) IS ALSO SEEN IN MEDIAN SAGITTAL SECTION. IN THE POSTERIOR PERFORATED SPACE OR FOSSA OF TARINI (FOSSA INTERPEDUNCULARIS TARINI) WE SEE THE *ANTERIOR RECESS (*RECESSUS ANTERIOR) BEHIND THE CORPUS ALBICANS SEU MAMILLARE, AND THE *POSTERIOR RECESS (*RECESSUS POSTERIOR) ABOVE THE UPPER MARGIN OF THE PONS VAROLII (see Appendix, note ³⁵²). IN THE SECTION OF THE CEREBELLUM WE SEE THE LAYERS OF WHITE SUBSTANCE (LAMINAE MEDULLARES) RAMIFYING OUTWARDS FROM THE WHITE CENTRE, AND SURROUNDED BY THE GREY CORTICAL SUBSTANCE (SUBSTANTIA CORTICALIS CEREBELLI); TO THE ARBORESCENT APPEARANCE THUS PRODUCED THE NAME OF ARBOR VITÆ CEREBELLI IS GIVEN.

¹ Or the "so-called peduncle of the corpus callosum" (Quain)—"formerly known as *pedunculus corporis callosi*" (Von Langer and Toldt).

² See Appendix, note ³⁵².

³ See Appendix, note ³⁵⁵.

⁴ See Appendix, note ³⁵⁴.

⁵ See Appendix, note ³⁵⁵.

⁶ See Appendix, note ³⁵⁴.

⁷ Commissure of the Habenulae—Macalister calls this the *transverse frænum of the pineal body*; according to Quain, it is the middle of the upper or dorsal portion of the *pedunculus conarii* or habenula. See detailed explanation in Appendix, note ³⁵⁵.

⁸ Also known as the *canaliculus*, and as the *epiphysis cerebri*. See Appendix, note ³⁵⁵.

⁹ Or *iter a tertio ad quartum ventriculorum*.

¹⁰ See Appendix, note ³⁵⁶.

¹¹ See Appendix, note ³⁵⁵.

¹² See Appendix, note ³⁵⁵.

¹³ In the original German, the anterior and posterior commissures are spoken of as the *commissures of the third ventricle*.

¹⁴ Also known as the *bulb of the fornix*.

*Rhombencephalon, Mesencephalon, and Thalamencephalon.

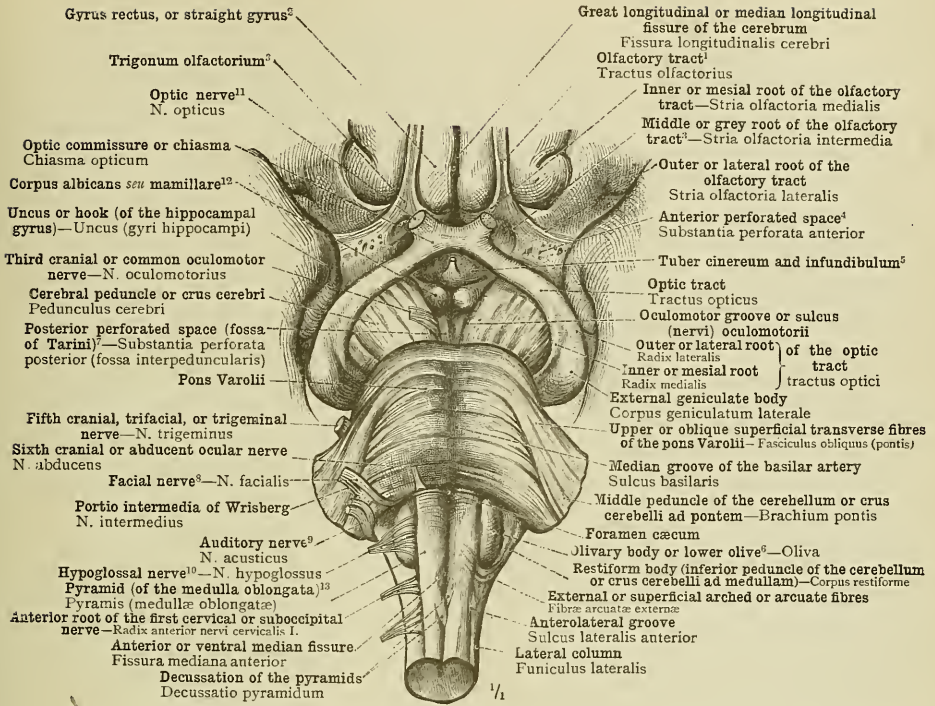


FIG. 1174.—THE MEDULLA OBLONGATA WITH THE PONS VAROLII, THE CEREBRAL PEDUNCLES OR CRURA CEREBRI (PEDUNCULI CEREBRI), AND THE ADJOINING PARTS AT THE FLOOR OF THE INTERBRAN, SEEN FROM THE BASAL SURFACE.

The two temporal lobes of the cerebrum were drawn far apart, in order that the optic tract (which is partially covered by the inner margin of the temporal lobe—i.e., by the hippocampal gyrus and its uncus), and the relation of this tract to the external geniculate body, might be fully displayed. Between the crura cerebri, diverging as they pass forwards from the pons Varolii, is the fossa of Tarini (fossa interpeduncularis), the floor of which is formed by the posterior perforated lamina or plate (see note 7 below); the outer boundary of the posterior perforated space is the oculomotor groove (sulcus nervi oculomotorii) in which the root bundles of the third cranial or common oculomotor nerve emerge from the brain. On the right side these root fibres have been preserved, but on the left they have been removed. By the separation of the two temporal lobes, the anterior perforated space (substantia perforata anterior—see note 4 below) has been exposed on either side, and its delimitation anteriorly by the trigonum olfactorium and posteriorly by the optic tract has been displayed. The cerebellum has been cut away on either side along the line of entry of its middle peduncles, the crura cerebelli ad pontem (brachia pontis).

¹ Sometimes erroneously spoken of as the *olfactory nerve*.

² See Appendix, note 367.

³ See Appendix, note 368.

⁴ The grey matter forming the floor of the *anterior perforated space* is distinguished by the name of the *anterior perforated plate* or *lamina*. See also Appendix, note 368.

⁵ See Appendix, note 368.

⁶ See Appendix, note 367.

⁷ The grey matter forming the floor of the *posterior perforated space* is distinguished by the name of the *posterior perforated plate* or *lamina*.

⁸ *Seventh cranial nerve* in Soemmerring's enumeration, *portio dura* of the *seventh* in that of Willis.

⁹ *Eighth cranial nerve* in Soemmerring's enumeration, *portio mollis* of the *seventh* in that of Willis.

¹⁰ *Twelfth cranial nerve* in Soemmerring's enumeration, *ninth cranial nerve* in that of Willis; also known as the *lingual motor nerve*.

¹¹ Or *second cranial nerve*.

¹² Also known as the *bulb of the fornix*.

¹³ See Appendix, note 368.

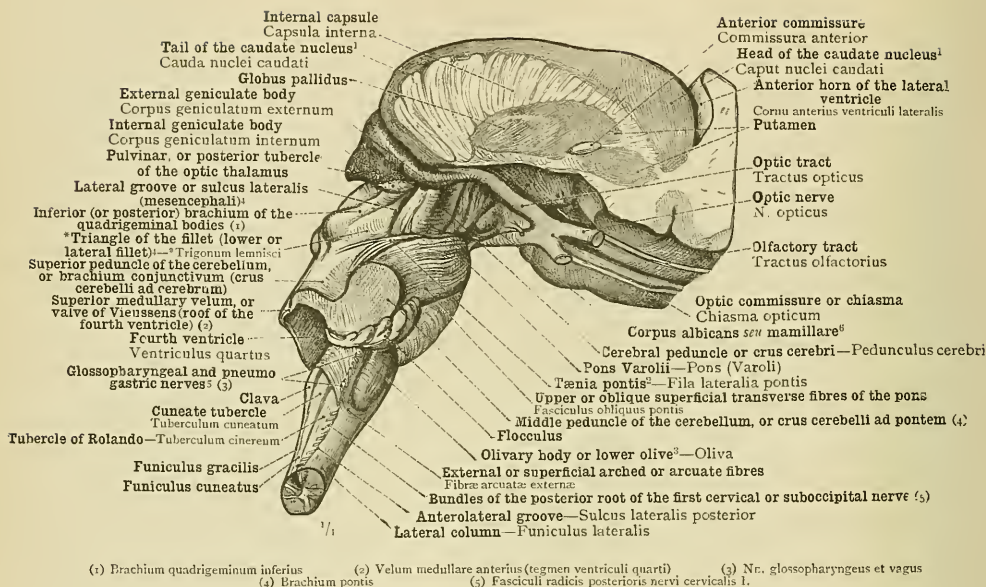


FIG. 1175.—THE MEDULLA OBLONGATA, WITH THE PONS VAROLII; THE CEREBRAL PEDUNCLES OR CRURA CEREBRI (PEDUNCULI CEREBRI), WITH THE ADJOINING *TRIANGLE OF THE FILLET (*TRIGONUM LEMNISCIS—see Appendix, note 300); THE QUADRIGEMINAL BODIES, CORPORA QUADRIGEMINA; THE PULVINAR, OR POSTERIOR TUBERCLE OF THE OPTIC THALAMUS; THE EXTERNAL AND INTERNAL GENICULATE BODIES, CORPUS GENICULATUM EXTERNUM ET CORPUS GENICULATUM INTERNUM; THE OPTIC TRACT (TRACTUS OPTICUS). SEEN FROM THE RIGHT SIDE.

The superior peduncle of the cerebellum, brachium conjunctivum, or crus cerebelli ad cerebrum, and the middle peduncle of the cerebellum, or crus cerebelli ad pontem (brachium pontis), were cut across at their junction with the cerebellum, of which last everything but the flocculus has been cut away. The preparation was separated from the right cerebral hemisphere by a section very nearly sagittal, passing through the caudate nucleus. The two parts of this nucleus, the head (caput), and the tail (cauda), are thus shown in sagittal section; by these the fibres (divided almost transversely) of the internal capsule (capsula interna, pedunculus corporis striati) are embraced above and behind; below the internal capsule are the globus pallidus and the putamen of the lenticular nucleus, and also the anterior commissure in transverse section.

¹ *Corpus Striatum*.—In England the *corpus striatum* is regarded as containing two nuclei, the *caudate nucleus* and the *lenticular nucleus*, quite frequently spoken of by their Latin names as *nucleus caudatus* and *nucleus lentiformis*, and sometimes also distinguished as the *intra-ventricular portion* (or *nucleus*) and *extra-ventricular portion* (or *nucleus*) of the *corpus striatum*. The corpora striata themselves are sometimes spoken of as the *ganglia of the cerebral hemispheres*. The anterior, larger extremity of the caudate nucleus is called the *head* or *caput*; the posterior, smaller extremity, the *tail* or *cauda*. Von Langer and Toldt regard the *lenticular nucleus* (*nucleus lentiformis*) as an independent mass of grey matter, not forming part of the *corpus striatum*. This latter, as it appears in the outer wall of the anterior horn of the lateral ventricle, the German authors divide into two portions: an anterior, *caput corporis striati*, and a posterior, *cauda corporis striati* (Fig. 1176, p. 767); but the corresponding English terms *head* and *tail* of the *corpus striatum* are not used by Quin. The *nucleus caudatus* is "the grey matter of the *corpus striatum*," and the names of the subdivisions of this nucleus, *caput nuclei caudati* and *cauda nuclei caudati* are applied by the German authors exactly as they are applied in England.

² *Tænia Pontis*.—Von Langer and Toldt describe in the following terms the fibres called by them the "*lateral strands of the pons*" (*op. cit.*, p. 515): "Not infrequently, at the upper margin of the pons Varolii, we see one or two slender separate bundles of fibres, which run across the peduncles of the cerebrum to join the superior peduncles of the cerebellum; these are called *fila lateralis pontis*." The reference to these fibres in Quin's "Anatomy" (vol. iii., part 1, p. 115) is very brief: "Some horizontal white striae usually pass out of the grey matter [of the posterior perforated space] and turn round the peduncles [of the cerebrum] close to the upper border of the pons, entering which they reach eventually the medullary centre of the cerebellum (*tænia pontis*)."

³ See Appendix, note 300.

⁴ See Appendix, note 300.

⁵ The *glossopharyngeal* is the ninth, and the *pneumogastric* (or *vagus*) is the tenth, cranial nerve in Soemmerring's enumeration. In that of Willis they constitute the first and second trunks, respectively, of the eighth cranial nerve.

⁶ Also known as the *bulb of the fornix*.

*Rhombencephalon, Mesencephalon, and Thalamencephalon.

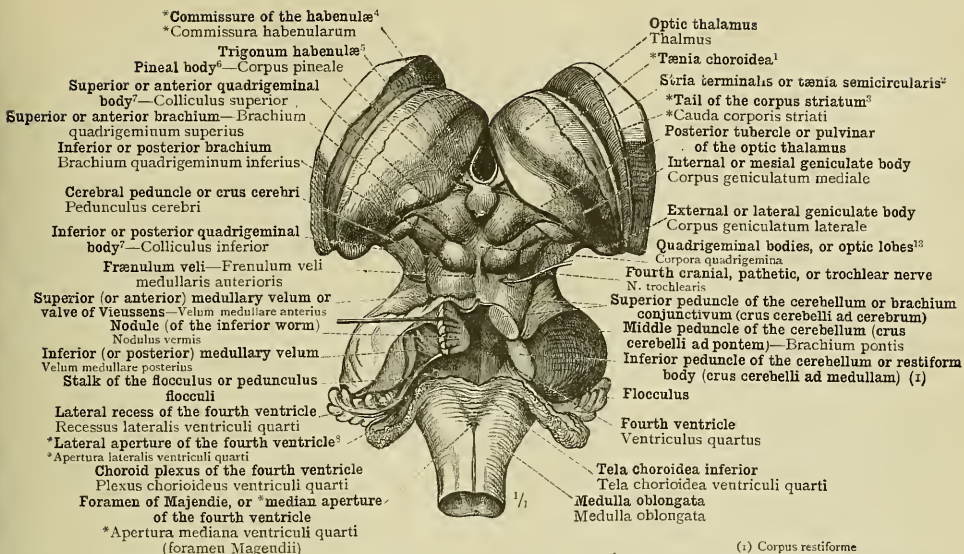


FIG. 1176.—THE MEDULLA OBLONGATA, THE CORPORA QUADRIGEMINA OR OPTIC LOBES WITH THEIR BRACHIA, THE OPTIC THALAMI, AND THE INTERNAL AND EXTERNAL GENICULATE BODIES; SEEN FROM THE DORSAL SIDE.

The tela choroidea inferior (tela choroidea ventriculi quarti), forming the roof of the lower part of the fourth ventricle, has been preserved; on either side, however, the outer part of the choroid plexuses of the fourth ventricle has been separated from the stalk of the flocculus or pedunculus flocculi (the outer thickened part of the lower free edge of the inferior, or posterior, medullary velum), and the lateral recesses of the fourth ventricle have thus been opened from behind. The upper part of the fourth ventricle has been opened by a median sagittal section through the worm of the cerebellum and part of the superior, or anterior, medullary velum or valve of Viëssens. The greater part of the cerebellum has been removed; the left half only of the nodulus with the flocculus and its stalk and the inferior, or posterior, medullary velum being retained.

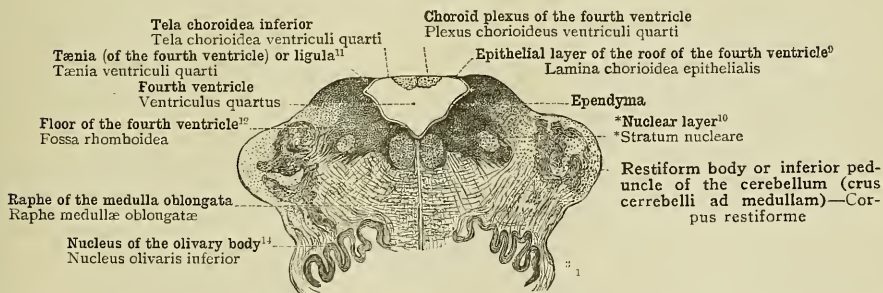


FIG. 1177.—THE LOWER PART OF THE FOURTH VENTRICLE, VENTRICULUS QUARTUS, IN CORONAL SECTION (SEMIDIAGRAMMATIC).

¹ See Appendix, note 370.

² See note ¹ to p. 784.

³ *I.e.*, surface of the tail of the candate nucleus as it appears in the wall of the lateral ventricle. See note ¹ to p. 766.

⁴ See Appendix, note 371.

⁵ See Appendix, note 365.

⁶ Known also as the *pineal gland*, the *conarium*, and the *epiphysis cerebri*. See Appendix, note 368.

⁷ See Appendix, note 372.

⁸ See Appendix, note 373.

⁹ See Appendix, note 374.

¹⁰ See Appendix, note 375.

¹¹ See note ¹ to p. 784.

¹² See Appendix, note 355.

¹³ See note ¹ to p. 766.

¹⁴ See Appendix, note 785.

*Rhombencephalon, Mesencephalon, and Thalamencephalon.

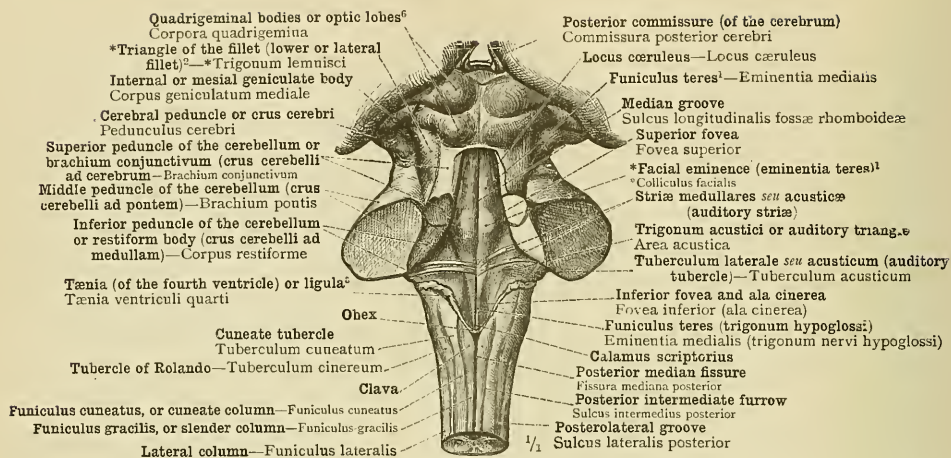


FIG. 1178.—THE FLOOR OF THE FOURTH VENTRICLE (FOSSA RHOMBOIDEA—see Appendix, note ³⁵⁵), DISPLAYED BY THE REMOVAL OF THE POSTERIOR WALL (ROOF) OF THE VENTRICLE AND ALSO OF THE CEREBELLUM. THE VENTRICLE IS SEEN TO BE BOUNDED Laterally BY THE RESTIFORM BODIES BELOW, AND BY THE SUPERIOR PEDUNCLES OF THE CEREBELLUM ABOVE; AND THE CONTINUITY OF ITS WALLS WITH THE SUBSTANCE OF THE MID-BRAIN IS MANIFEST.

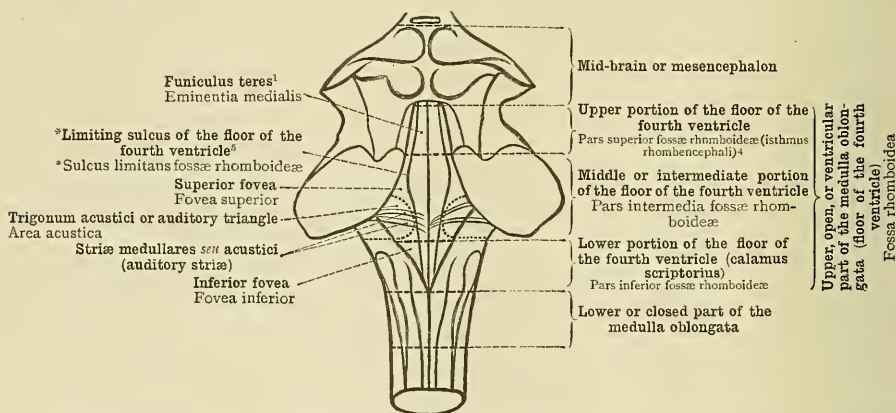


FIG. 1179.—SUBDIVISIONS OF THE MEDULLA OBLONGATA AND THE FLOOR OF THE FOURTH VENTRICLE (DIAGRAMMATIC).

¹ See Appendix, note 376.

⁴ See Appendix, note 369.

² See Appendix, note 369.

⁵ See Appendix, note 377.

³ See note 1 to p. 784.

⁶ See note 5 to p. 760.

*Rhombencephalon and Mesencephalon.

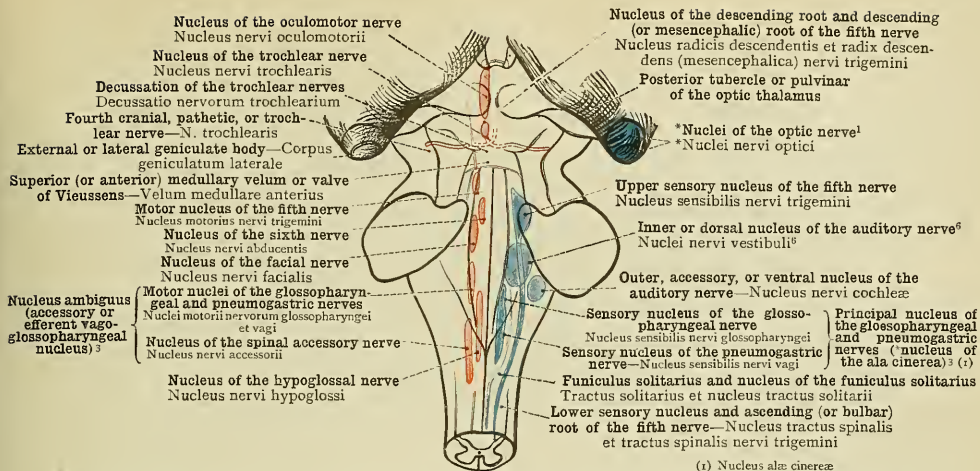


FIG. 1180.—THE NUCLEI OF ORIGIN OF THE CRANIAL NERVES, NUCLEI ORIGINIS NERVORUM CEREBRARIUM, IN THE *RHOMBENCEPHALON AND MESENCEPHALON; SEEN FROM BEHIND, IN DIAGRAMMATIC PROJECTION.

The efferent or motor nuclei are represented on the left side only, and are coloured red; the afferent or sensory nuclei are represented on the right side only and are coloured blue.

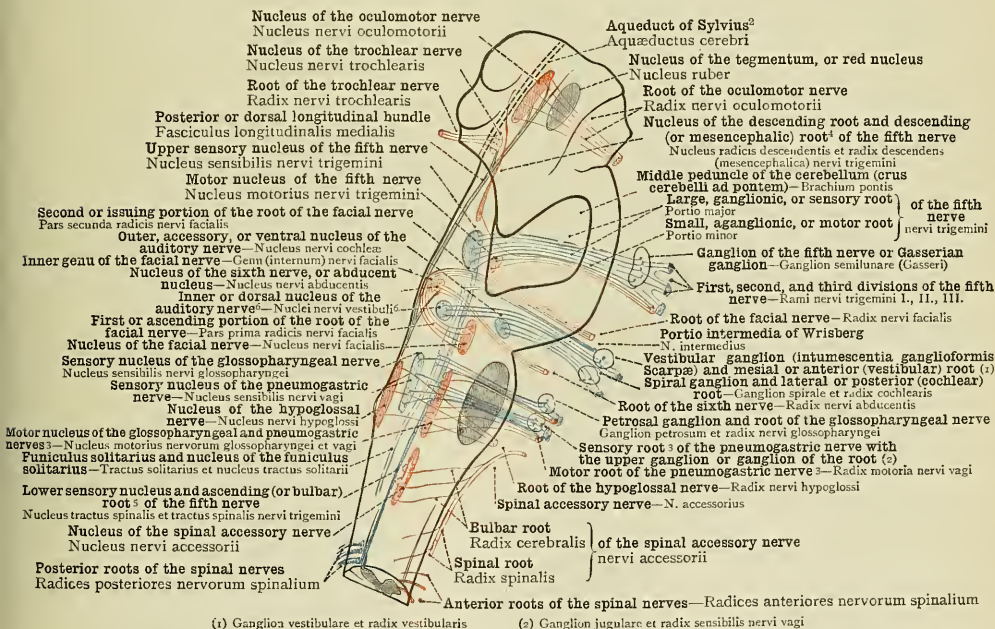


FIG. 1181.—THE NUCLEI OF ORIGIN OF THE CRANIAL NERVES, NUCLEI ORIGINIS NERVORUM CEREBRARIUM, IN THE *RHOMBENCEPHALON AND MESENCEPHALON; SEEN FROM THE SIDE IN DIAGRAMMATIC PROJECTION.

The efferent or motor nuclei and roots are coloured red; the afferent or sensory nuclei and roots are coloured blue.

¹ See Appendix, note 378.

² Or iter a tertio ad quartum ventriculum.

³ See Appendix, note 379.

⁴ Called by Gowers the upper root.

⁵ Called by Gowers the lower root.

⁶ *Nuclei Nervi Vestibuli*.—The author uses the term *nuclei* in the plural because, according to his view, "the vestibular root of the auditory nerve passes chiefly to the nucleus of Deiters, but in part also to the dorsal nucleus." (Von Langsdorff, *l. cit.*, p. 549). According to Quain, on the other hand, most of the fibres of the vestibular root pass to the dorsal nucleus, and the connexion of this root with the nucleus of Deiters is doubtful.

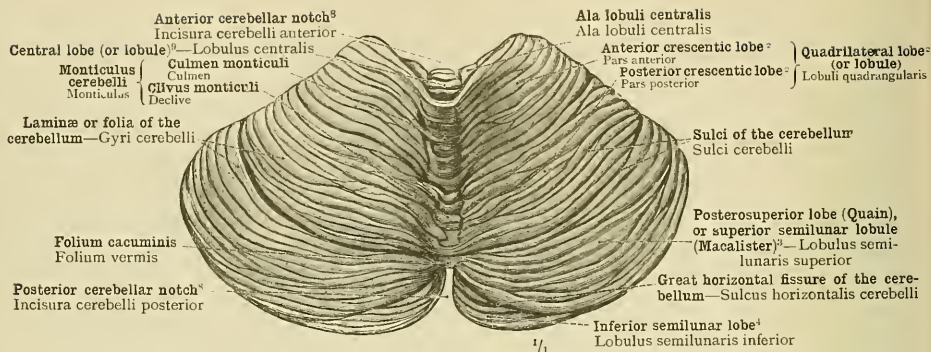


FIG. 1182.—THE CEREBELLUM, SEPARATED FROM ITS ATTACHMENTS. UPPER SURFACE, FACIES SUPERIOR. THE SUBDIVISION OF THE UPPER WORM OR SUPERIOR VERMIFORM PROCESS (VERMIS SUPERIOR) INTO THE CENTRAL LOBE OR LOBULE (LOBULUS CENTRALIS), THE MONTICULUS—CONSISTING OF AN ANTERIOR PART OR CULMEN AND A POSTERIOR PART OR CLIVUS (DECLIVE)—AND THE FOLIUM CACUMINIS (FOLIUM VERMIS). THE SUBDIVISION OF THE HEMISPHERES (HEMISPHERIA CEREBELLI) INTO THE ALA LOBULI CENTRALIS, THE QUADRILATERAL LOBE (LOBULUS QUADRANGULARIS²), AND THE POSTEROSUPERIOR LOBE OR SUPERIOR SEMILUNAR LOBULE (LOBULUS SEMILUNARIS SUPERIOR³).¹

Regarding the nomenclature of the parts of the cerebellum in general, see Appendix, note 3².

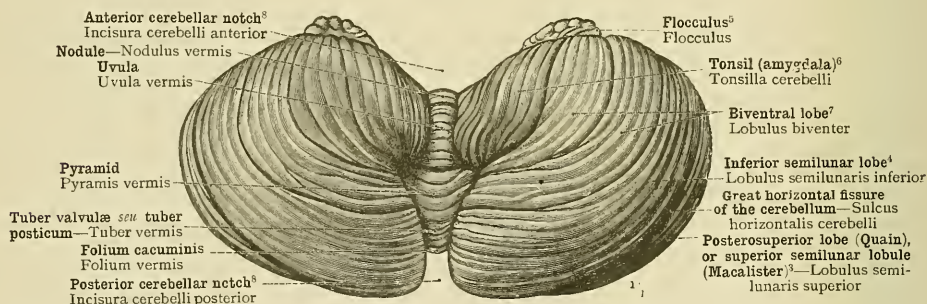


FIG. 1183.—THE INFERIOR SURFACE OF THE CEREBELLUM, FACIES INFERIOR CEREBELLI. THE SUBDIVISION OF THE LOWER WORM OR INFERIOR VERMIFORM PROCESS (VERMIS INFERIOR) INTO THE TUBER VALVULÆ SEU TUBER POSTICUM (TUBER VERMIS), THE PYRAMID (PYRAMIS VERMIS), THE UVULA (UVULA VERMIS), AND THE NODULE (NODULUS VERMIS). THE SUBDIVISION OF THE HEMISPHERES (HEMISPHERIA CEREBELLI) INTO THE INFERIOR SEMILUNAR LOBE OR MARGINAL LOBULE (LOBULUS SEMILUNARIS INFERIOR⁴), THE BIVENTRAL LOBE OR CUNEIFORM OR DIGASTRIC LOBULE (LOBULUS SEMILUNARIS INFERIOR⁴), THE TONSIL OR AMYGDALA (TONSILLA CEREBELLI⁶), AND THE FLOCCULUS OR SUBPEDUNCULAR LOBE (FLOCCULUS).¹

¹ See Appendix, note 3².

² See Appendix, note 3².

³ Ellis (*op. cit.*) calls this the *posterior lobe* (of the upper surface).

⁴ Called by Macalister the *marginal lobule*, and by Ellis the *posterior lobe* (of the under surface). See also Appendix, note 3².

⁵ Ellis gives *subpeduncular lobe* as an alternative name for the *flocculus*.

⁶ The *tonsil* or *amygdala* of the cerebellum is by Macalister called the *tonsillitic lobe*, and by Ellis the *amygdaloid lobe*.

⁷ By Macalister called the *cuneiform* or *digastric lobule*. See also Appendix, note 3².

⁸ *Cerebellar Notches*.—Alternative names for these are given by Quain—viz., for the *posterior notch*, *incisura marsupialis*; and for

the *anterior notch*, *incisura semilunaris*.

⁹ See Appendix, note 3².

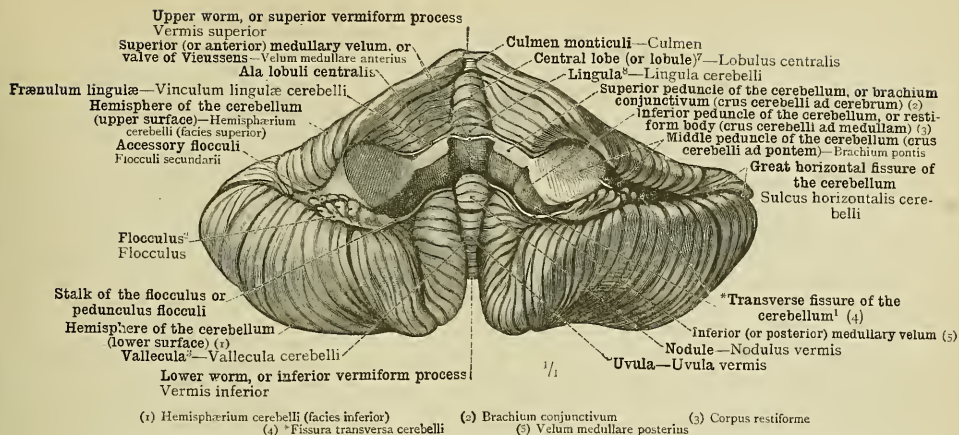


FIG. 1184.—THE CEREBELLUM, SEPARATED FROM ITS ATTACHMENTS, SEEN FROM BEFORE. THE ENTRANCE OF THE THREE PAIRS OF CEREBELLAR PEDUNCLES (VIZ., THE MIDDLE PEDUNCLES, BRACHIA PONTIS, THE INFERIOR PEDUNCLES, CORPORA RESTIFORMIA, AND THE SUPERIOR PEDUNCLES, BRACHIA CONJUNCTIVA, WITH THE SUPERIOR MEDULLARY VELUM OR VALVE OF VIEUSSENS) INTO THE MEDULLARY CENTRE OF THE CEREBELLUM THROUGH THE *TRANSVERSE FISSURE OF THE CEREBELLUM, *FISSURA TRANSVERSA CEREBELLI (i.e., THE ANTERIOR PART OF THE GREAT HORIZONTAL FISSURE¹). THE LINGULA OF THE UPPER WORM, LINGULA CEREBELLI, WITH ITS LATERAL EXTENSIONS, FRÆNULA LINGULÆ (VINCULA LINGULÆ CEREBELLI).

Regarding the nomenclature of the parts of the cerebellum, see Appendix, note ³⁸⁰.

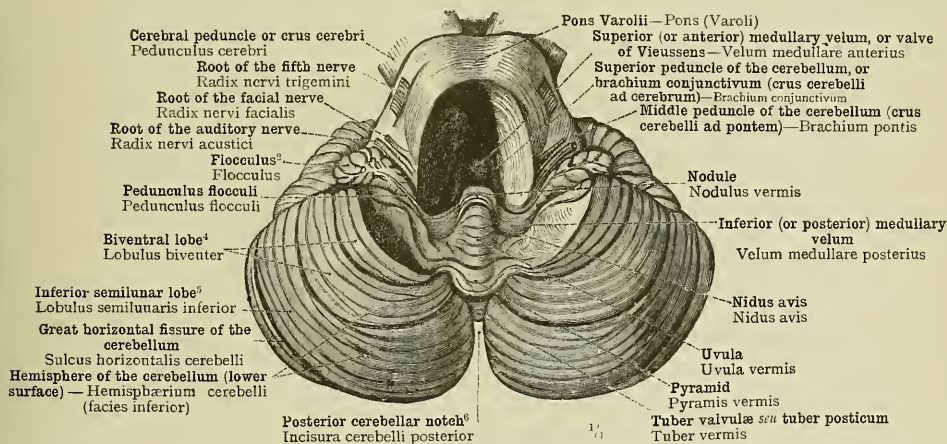


FIG. 1185.—THE LOWER SURFACE OF THE CEREBELLUM WITH THE PONS VAROLII. BY THE REMOVAL OF A PORTION OF THE LATTER, THE LOWER SURFACE OF THE SUPERIOR (OR ANTERIOR) MEDULLARY VELUM OR VALVE OF VIEUSSENS (VELUM MEDULLARE ANTERIUS) HAS BEEN EXPOSED; AND BY SHELLING OUT THE TONSIL (AMYGDALA) THE INFERIOR (OR POSTERIOR) MEDULLARY VELUM (VELUM MEDULLARE POSTERIUS), WITH THE PEDUNCULUS FLOCCULI, HAS BEEN LAID BARE (see Appendix, note ³⁸⁰).

1 See Appendix, note ³⁸².

2 Or subpeduncular lobe (Ellis).

3 Vallecula.—Macalister makes use of the English equivalent, valley, for this median fossa.

4 By Macalister called the cuneiform or digastric lobule. See also Appendix, note ³⁸⁰.

5 Called by Macalister the marginal lobule, and by Ellis the anterior lobe (of the under surface). See also Appendix, note ³⁸⁰.

6 See note 8 to p. 770.

7 See Appendix, note ³⁸².

8 Or linguetta lammosa (Macalister).

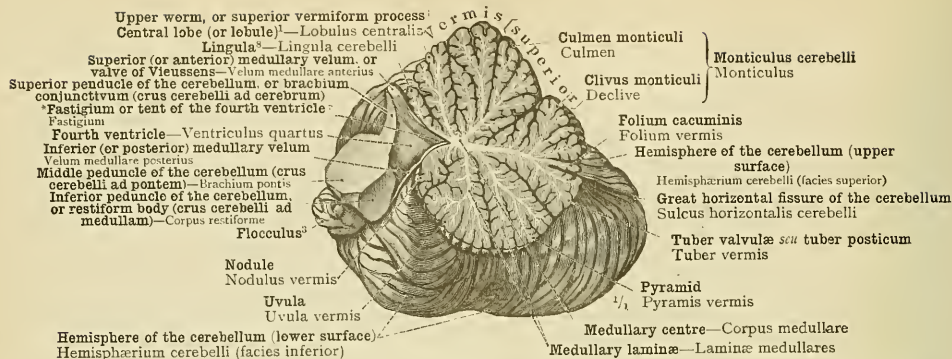


FIG. 1186.—MEDIAN SAGITTAL SECTION THROUGH THE WORM OR VERMIFORM PROCESS (VERMIS) OF THE CEREBELLUM. THE SUBDIVISIONS OF THE UPPER WORM OR SUPERIOR VERMIFORM PROCESS (VERMIS SUPERIOR) AND THE LOWER WORM OR INFERIOR VERMIFORM PROCESS (VERMIS INFERIOR). THE CONTINUITY OF THE SUPERIOR (OR ANTERIOR) MEDULLARY VELUM OR VALVE OF VIEUSSENS WITH THE MEDULLARY CENTRE OF THE WORM. THE TENT-SHAPED PROJECTION (*FASTIGIUM—see Appendix, note ³⁶⁶) IN THE ROOF OF THE FOURTH VENTRICLE.

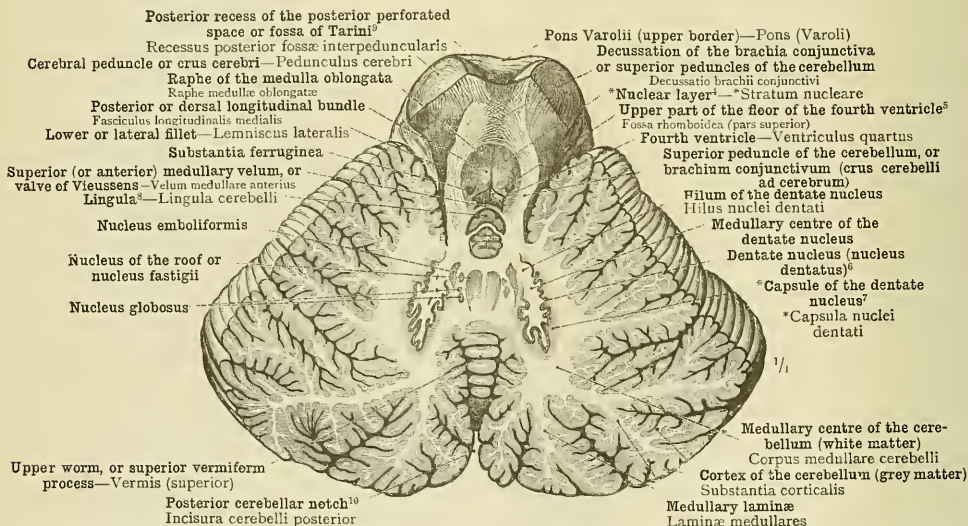


FIG. 1187.—SECTION THROUGH THE CEREBELLUM AND THE PEDUNCLES OF THE CEREBELLUM IN THE PLANE OF THE BRACHIA CONJUNCTIVA OR SUPERIOR PEDUNCLES OF THE CEREBELLUM. UPPER SURFACE OF LOWER SEGMENT. THE MEDULLARY CENTRE OR WHITE MATTER AND THE MEDULLARY LAMINAE OF THE HEMISPHERES OF THE CEREBELLUM. THE NUCLEI OF THE WHITE MATTER OF THE CEREBELLUM: THE DENTATE NUCLEUS, NUCLEUS DENTATUS (CORPUS DENTATUS, CORPUS CILIARE); THE NUCLEUS EMBOLIFORMIS; THE NUCLEUS GLOBOSUS; AND THE NUCLEUS FASTIGII. THE DECUSSATION OF THE SUPERIOR PEDUNCLES OF THE CEREBELLUM, DECUSSATIO BRACHII CONJUNCTIVI.¹¹

Regarding the nomenclature of the parts of the cerebellum, see Appendix, note ³⁶⁰.

¹ See Appendix, note ³⁶⁰.

² See Appendix, note ³⁷⁵.

³ Known also as the *corpus dentatum* or *corpus ciliare*.

⁴ Or *Eugenia lamina* (Macalister).

⁵ See Appendix, note ³⁶⁶.

⁶ See note ³ to p. 770.

⁷ See Appendix, note ³⁶⁴.

⁸ See note ³ to p. 770.

⁹ See Appendix, note ³⁶⁶.

¹⁰ See note ³ to p. 770.

¹¹ *Decussatio Brachii Conjunctivi*.—Thus in the original. Since, however, a single brachium cannot decussate, the name should be *decussatio brachiorum conjunctivorum*.

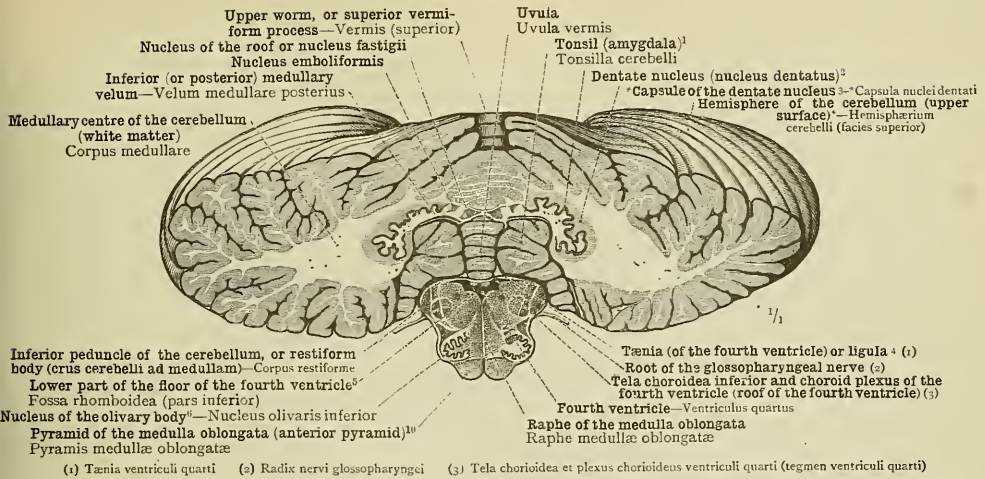


FIG. 1188.—CORONAL SECTION THROUGH THE CEREBELLUM AND THE MEDULLA OBLONGATA IN THE REGION OF THE RESTIFORM BODIES (INFERIOR PEDUNCLES OF THE CEREBELLUM, CRURA CEREBELLI AD MEDULLAM); THE RESPECTIVE RELATIONS OF THE MEDULLA AND THE CEREBELLUM TO THE LOWER PART OF THE FOURTH VENTRICLE. THE NUCLEI OF THE WHITE MATTER OF THE CEREBELLUM.

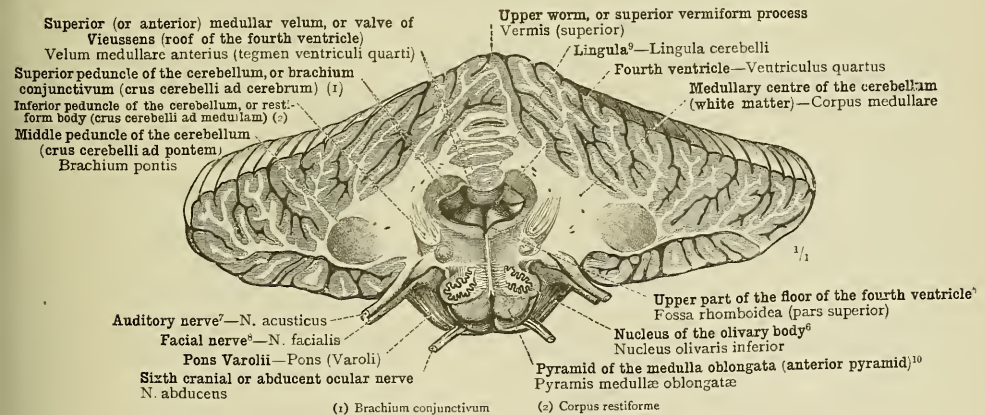


FIG. 1189.—CORONAL SECTION THROUGH THE CEREBELLUM AND THE MEDULLA OBLONGATA IN THE REGION OF THE BRACHIA CONJUNCTIVA OR SUPERIOR PEDUNCLES OF THE CEREBELLUM; THE RESPECTIVE RELATIONS OF THE MEDULLA AND THE CEREBELLUM TO THE UPPER PART OF THE FOURTH VENTRICLE. THE COURSE OF THE PEDUNCLES OF THE CEREBELLUM IN THE MEDULLARY CENTRE OR WHITE MATTER OF THE CEREBELLUM.

¹ The tonsil or amygdala of the cerebellum is by Macalister called the *tonsillitic lobe*, and by Ellis the *amygdaloid lobe*.

² Known also as the *corpus dentatum*, or *corpus ciliare*.

³ See note ¹ to p. 754.

⁴ See note ¹ to p. 754.

⁵ See Appendix, note 355.

⁶ See Appendix, note 355.

⁷ Eighth cranial nerve in Soemmerring's enumeration; *portio mollis of the seventh cranial nerve* in that of Willis.

⁸ Seventh cranial nerve in Soemmerring's enumeration; *portio dura of the seventh cranial nerve* in that of Willis.

⁹ Or *linguetta laminea* (Macalister).

¹⁰ See Appendix, note 353.

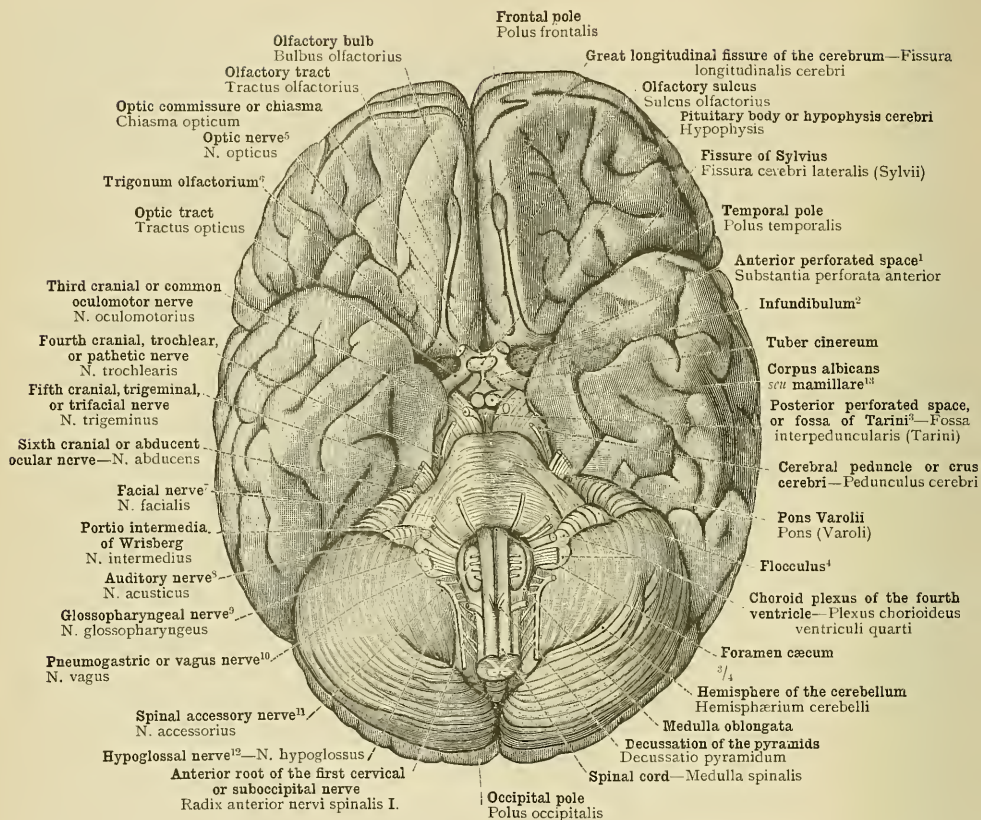


FIG. 1190.—THE INFERIOR SURFACE (BASE) OF THE BRAIN, BASIS ENCEPHALI, WITH THE EMERGING ROOTS OF THE CRANIAL NERVES, RADICES NERVORUM CEREBRALIUM. THE INFERIOR OR BASAL SURFACE OF THE CEREBRUM, FACIES BASALIS CEREBRI, IS CONCEALED BEHIND BY THE CEREBELLUM.

¹ The grey matter forming the floor of the anterior perforated space is distinguished by the name of the anterior perforated plate or lamina.

² See Appendix, note 364.

³ Or second cranial nerve.

⁴ See Appendix, note 362.

⁵ See Appendix, note 368.

⁶ Or subpeduncular lobe (Ellis).

⁷ Seventh cranial nerve in Soemmerring's enumeration; portio dura of the seventh cranial nerve in that of Willis.

⁸ Eighth cranial nerve in Soemmerring's enumeration; portio mollis of the eighth cranial nerve in that of Willis.

⁹ Ninth cranial nerve in Soemmerring's enumeration; first trunk of the eighth cranial nerve in that of Willis.

¹⁰ Tenth cranial nerve in Soemmerring's enumeration; second trunk of the eighth cranial nerve in that of Willis.

¹¹ Eleventh cranial nerve in Soemmerring's enumeration; third trunk of the eighth cranial nerve in that of Willis.

¹² Twelfth cranial nerve in Soemmerring's enumeration, ninth in that of Willis; also known as the lingual motor nerve.

¹³ Also known as the bulb of the fornix.

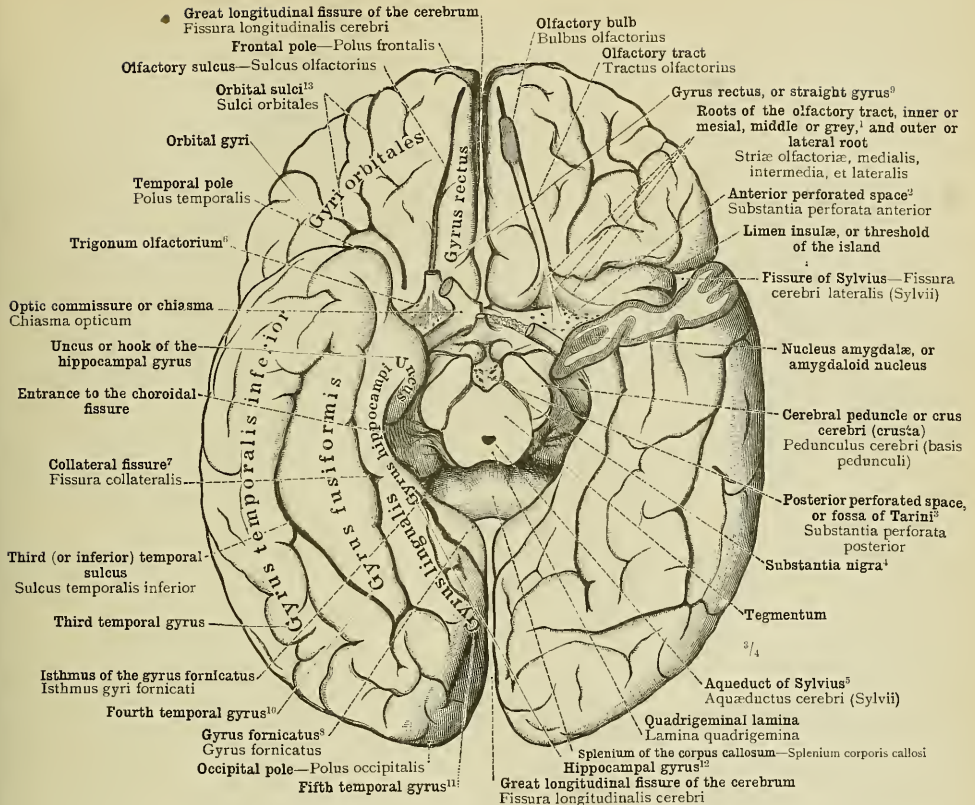


FIG. 1191.—THE INFERIOR OR BASAL SURFACE OF THE CEREBRUM, FACIES BASALIS CEREBRI; THE WHOLE EXTENT OF THIS SURFACE IS VISIBLE, THE MEDULLA OBLONGATA, PONS VAROLII, AND CEREBELLUM (*i.e.*, the *RHOMBENCEPHALON—see Appendix, note 355) HAVING BEEN REMOVED BY A TRANSVERSE SECTION THROUGH THE MID-BRAIN. CONVOLUTIONS AND FURROWS OF THE HEMISPHERES, GYRI ET SULCI CEREBRI. THE FRONTAL, TEMPORAL, AND OCCIPITAL POLES OF THE HEMISPHERES.

The anterior extremity of the left temporal lobe has been cut away, the optic commissure or chiasma has been cut through in the median plane, and its left half has been removed. The anterior perforated space has thus been fully exposed on the left side, and its relations to the threshold of the island, limen insulae, and to the parts of the rhinencephalon situate on the mesial surface of the hemisphere, have been made manifest. The olfactory tract, tractus olfactorius, has been cut away on the right side, in order to display the olfactory sulcus.

¹ See Appendix, note 368.

² The grey matter forming the floor of the anterior perforated space is distinguished by the name of the anterior perforated plate or lamina.

³ The grey matter forming the floor of the posterior perforated space is distinguished by the name of the posterior perforated plate or lamina. See also Appendix, note 362.

⁴ Called by Macalister the *locus niger*.

⁵ Or *iter a tertio ad quartum ventriculum*.

⁶ See Appendix, note 368.

⁷ Sometimes regarded also as the fourth temporal sulcus.

⁸ See Appendix, note 362.

⁹ See Appendix, note 361.

¹⁰ Fourth Temporal Gyrus.—The posterior part of this gyrus was formerly known in England as the *fusiform lobule*; and the gyrus as a whole is called by Todd *gyrus fusiformis*.

¹¹ Fifth Temporal Gyrus.—The author's name for this is *gyrus lingualis*, a modification of Huschke's *lingual lobule*; Wilder called it the *subcalcarine gyrus*; and it is often known as the *infracalcarine gyrus*. In front it is continued into the hippocampal gyrus. See note 12 below.

¹² Hippocampal Gyrus.—This was formerly called the *subiculum cornu ammonis*; together with the fifth temporal or infracalcarine gyrus (see note 11 above), it makes up the *uncinate gyrus*. See also Appendix, note 360.

¹³ Orbital Sulci.—The principal sulci of the orbital surface of the frontal lobe very commonly communicate with one another, combining to form what is known in England as the *orbital or triradiate sulcus*.

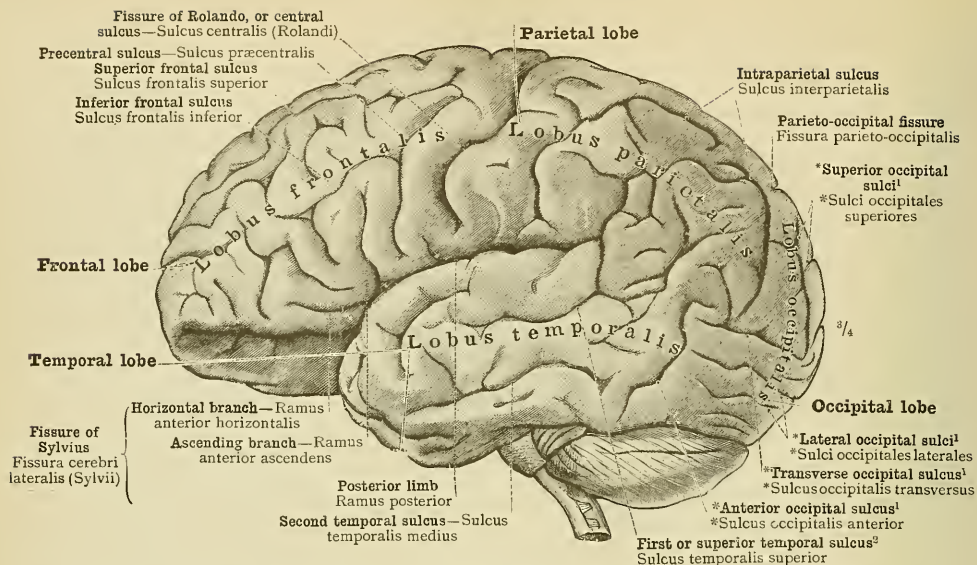


FIG. 1192.—THE CONVEX OR OUTER SURFACE, FACIES CONVEXA, OF THE LEFT CEREBRAL HEMISPHERE, SEEN FROM THE SIDE. FRONTAL, PARIETAL, TEMPORAL, AND OCCIPITAL LOBES.

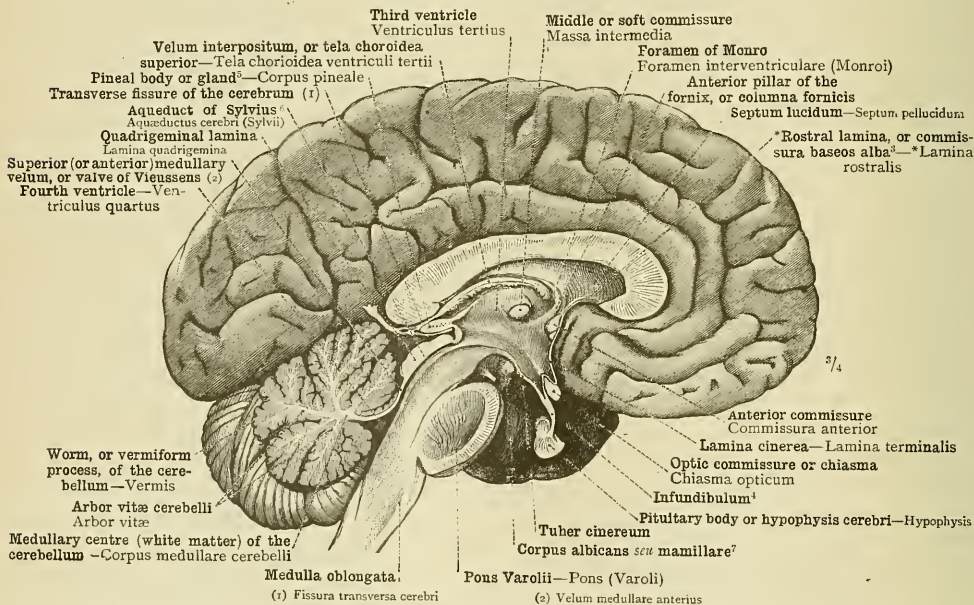


FIG. 1193.—MEDIAN SAGITTAL SECTION THROUGH THE BRAIN. THE INNER OR MESIAL SURFACE, FACIES MEDIALIS, OF THE LEFT CEREBRAL HEMISPHERE.

¹ See Appendix, note 386.

² Also called, from its relation to the fissure of Sylvius, the *parallel fissure*.

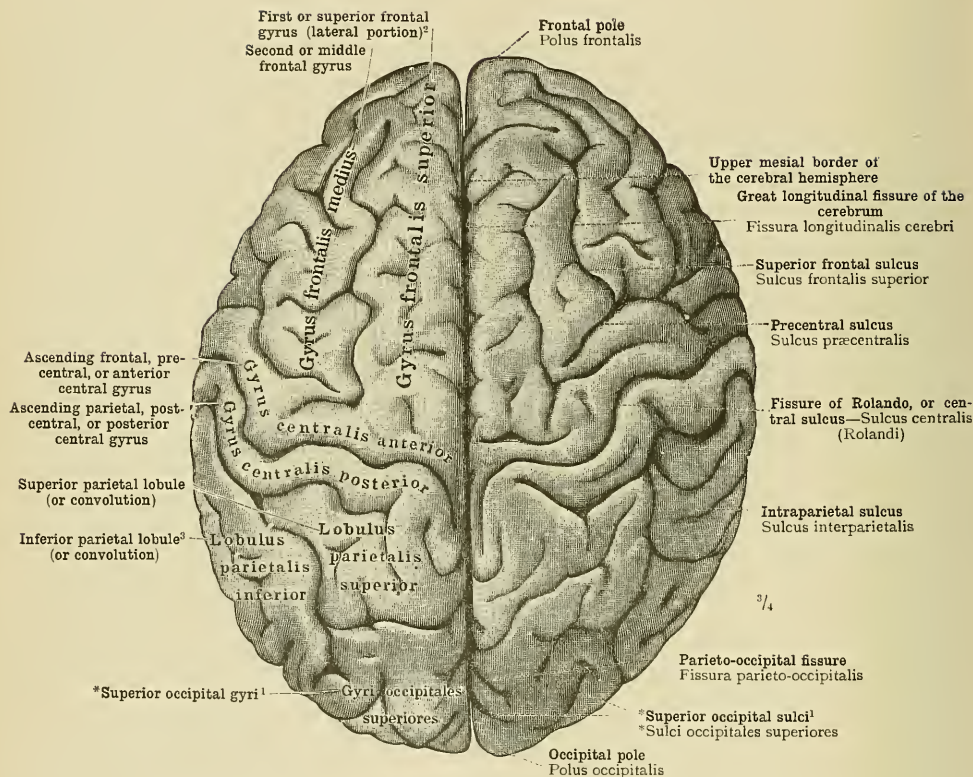
³ See Appendix, note 387.

⁴ See Appendix, note 384.

⁵ Also known as the *conarium* and as the *epiphysis cerebri*. See Appendix, note 365.

⁶ Or iter a tertio ad quartum ventriculū.

⁷ Also known as the *bulb of the fornix*.



¹ See Appendix, note 356.

² See Appendix, note 355.

³ See note 5 to p. 777.

FIG. 1196.—THE HEMISPHERES OF THE CEREBRUM, HEMISPHERIA CEREBRI; THEIR OUTER OR CONVEX SURFACE, FACIES CONVEXA, SEEN FROM ABOVE. GYRI AND SULCI OF THE CEREBRUM. DIPPING DEEPLY BETWEEN THE TWO HEMISPHERES IS THE GREAT LONGITUDINAL FISSURE OF THE CEREBRUM; ON EITHER SIDE OF THIS FISSURE IS THE UPPER MESIAL BORDER OF THE HEMISPHERE, WHICH SEPARATES THE OUTER OR CONVEX SURFACE OF THE HEMISPHERE FROM ITS INNER OR MESIAL SURFACE, AND EXTENDS FROM THE FRONTAL TO THE OCCIPITAL POLE.

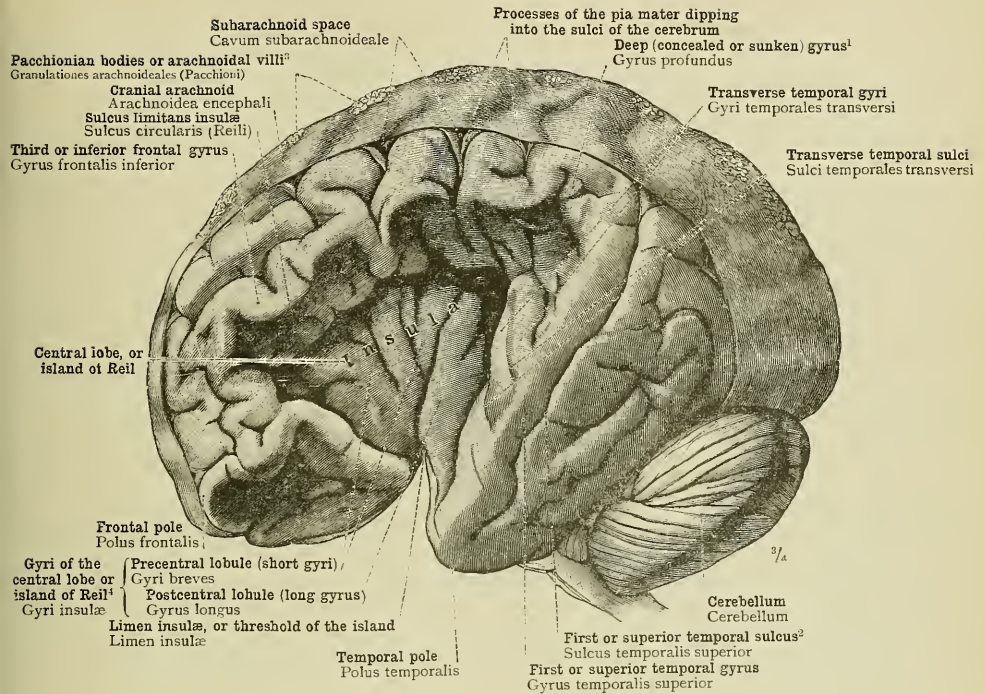


FIG. 1197.—THE OUTER OR CONVEX SURFACE, FACIES CONVEXA, OF THE LEFT CEREBRAL HEMISPHERE, SEEN FROM THE SIDE. THE TEMPORAL LOBE HAS BEEN DRAWN AWAY AS FAR AS POSSIBLE FROM THE FRONTAL AND PARIETAL LOBES, SO THAT THE SYLVIAN FISSURE IS WIDELY OPENED, AND IN THE DEPTH OF THIS FISSURE THE CENTRAL LOBE OR ISLAND OF REIL (INSULA) WITH ITS GYRI IS DISPLAYED, AND THE TRANSVERSE TEMPORAL SULCI AND GYRI ON THE UPPER SURFACE OF THE TEMPORAL LOBE ARE ALSO EXPOSED TO VIEW.

ON THE SURFACE OF THE UPPER PART OF THE HEMISPHERE THE PIA MATER AND THE ARACHNOID (PIA MATER ET ARACHNOIDEA ENCEPHALI) HAVE BEEN LEFT INTACT; BY DRAWING THE GYRI OF THIS PART OF THE BRAIN A LITTLE AWAY FROM ONE ANOTHER, THE LAMELLIFORM DUPLICATIONS OF PIA MATER PASSING TO THE BOTTOM OF THE SULCI ARE DISPLAYED. THROUGH THE DURA MATER, ALONG THE LINE OF THE SUPERIOR LONGITUDINAL SINUS, THE PACCHIONIAN BODIES (GRANULATIONES ARACHNOIDEALES PACCHIONI) ARE VISIBLE.

¹ *Gyri Profundi*.—This name is given by the author to convolutions that do not appear on the surface of the brain, being hidden in the depths of the sulci and fissures, and becoming visible only when these are widely opened. In England they are known most suitably as *concealed gyri*.

² Also called, from its relation to the fissure of Sylvius, the *parallel fissure*.

³ Known also as *Pacchionian glands* or *Pacchionian granulations*.

⁴ The longest and deepest sulcus on the surface of the island of Reil, which separates the precentral lobule (gyri breves) from the postcentral lobule (gyrus longus), has been called the *sulcus centralis insulae*. It is well marked in Fig. 1197.

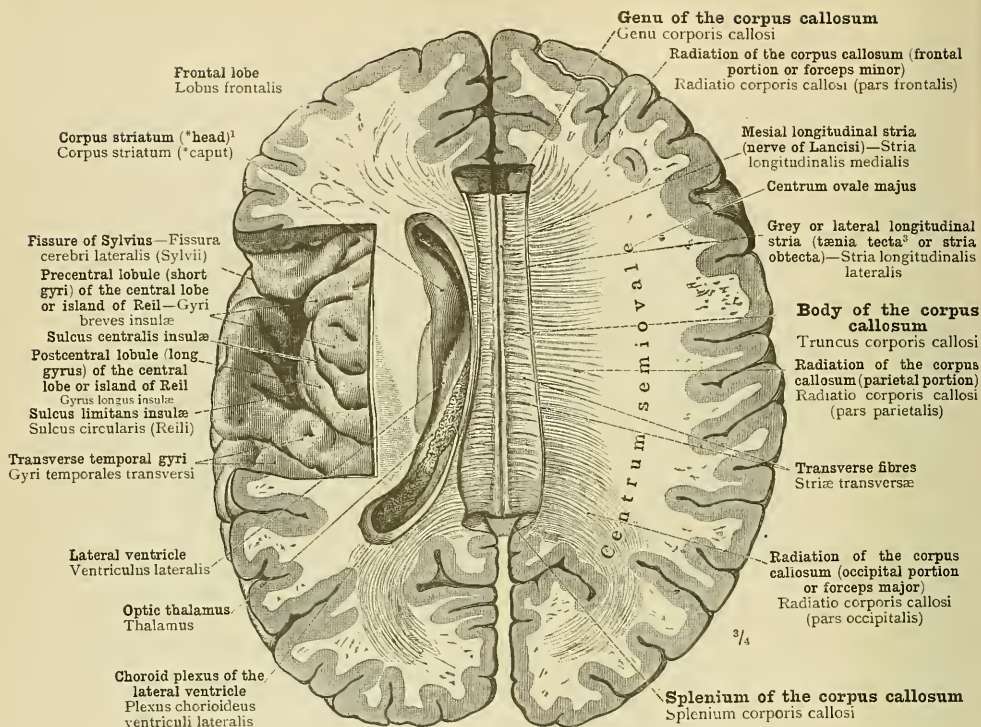


FIG. 1198.—THE UPPER PART OF BOTH CEREBRAL HEMISPHERES HAS BEEN REMOVED BY A SECTION IN THE PLANE OF THE DORSAL SURFACE OF THE CORPUS CALLOSUM OR GREAT COMMISSURE OF THE CEREBRUM (TRABS CEREBRI), SO THAT THE DORSUM OF THAT BODY IS FULLY EXPOSED, AND THE MEDULLARY CENTRE OR WHITE MATTER (MEDULLUM) OF THE CEREBRAL HEMISPHERES IS SEEN IN SECTION AS THE CENTRUM OVALE MAJUS (CENTRUM SEMIOVALE)².

IN THE RIGHT HEMISPHERE, THE SEVERAL PORTIONS OF THE RADIATION OF THE FIBRES OF THE CORPUS CALLOSUM (RADIATIO CORPORIS CALLOSI) ARE INDICATED. IN THE LEFT HEMISPHERE, SEGMENTS HAVE BEEN REMOVED IN SUCH A MANNER AS ON THE ONE HAND TO EXPOSE FROM ABOVE THE CENTRAL LOBE OR ISLAND OF REIL (INSULA), AND ON THE OTHER TO OPEN THE LATERAL VENTRICLE, AND THUS TO DISPLAY THE *HEAD OF THE CORPUS STRIATUM (*i.e.*, THE HEAD OF THE CAUDATE OR INTRAVENTRICULAR NUCLEUS OF THE CORPUS STRIATUM—see note ¹ to p. 766) WITH THE NEIGHBOURING PART OF THE OPTIC THALAMUS. THE MUTUAL RELATIONS OF THESE PARTS OF THE CEREBRUM ARE THUS MADE MANIFEST.

¹ See note ¹ to p. 766.

² *Centrum Semiovale*.—The central white matter seen in a horizontal section of one cerebral hemisphere at the level of the horizontal part of the callosomarginal fissure is known as the *centrum ovale minus*. If the upper part of both hemispheres be removed by a horizontal section in the plane of the dorsal surface of the corpus callosum, the white centres of the two hemispheres united by the upper surface of the corpus callosum make up the *centrum ovale majus*. The author is therefore strictly accurate in speaking of the white matter of a single hemisphere displayed by a section at this level as the *centrum semiovale*, but the latter term is not often used in England.

³ See Appendix, note 392.

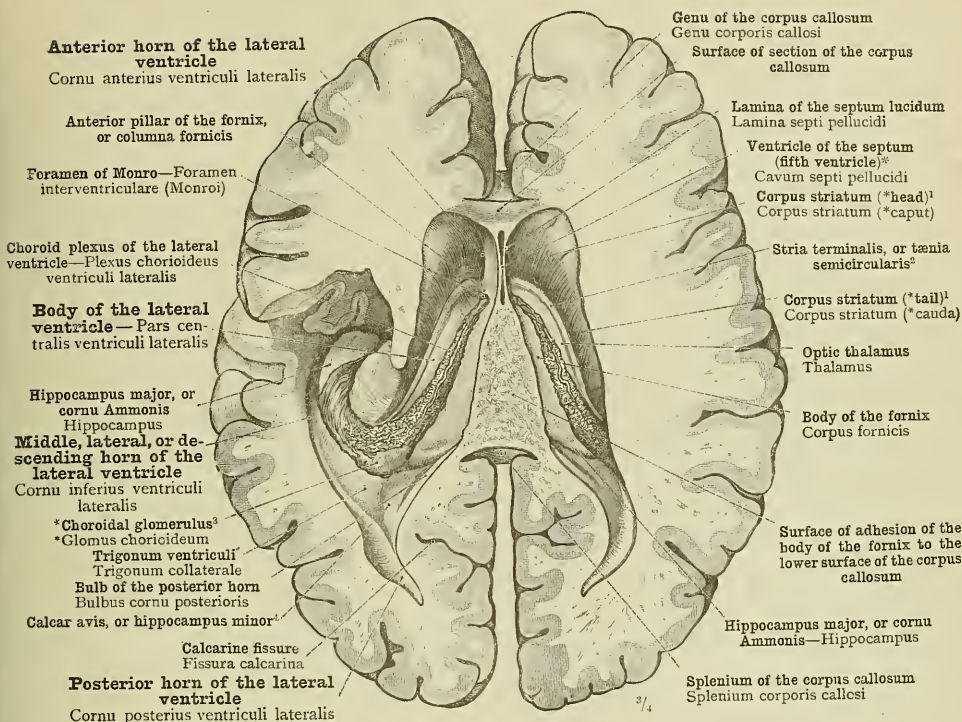


FIG. 1199.—THE UPPER PORTION OF THE CEREBRAL HEMISPHERES AND OF THE CORPUS CALLOSUM OR GREAT COMMISSURE OF THE CEREBRUM (TRAUS CEREBRI) HAVING BEEN REMOVED, THE UPPER OR DORSAL SURFACE OF THE FORNIX WAS EXPOSED AND BOTH LATERAL VENTRICLES (VENTRICULI LATERALES) WERE OPENED. IN THE RIGHT HEMISPHERE, THE ANTERIOR HORN (CORNU ANTERIUS), POSTERIOR HORN (CORNU POSTERIUS), AND THE BODY (PARS CENTRALIS), ONLY, OF THE VENTRICLE ARE DISPLAYED; WHEREAS IN THE LEFT HEMISPHERE, BY THE REMOVAL OF A FURTHER PORTION OF THE BRAIN SUBSTANCE, THE MIDDLE, LATERAL, OR DESCENDING HORN (CORNU INFERIUS), DESCENDING INTO THE TEMPORAL LOBE, HAS ALSO BEEN OPENED. THE SEPTUM BETWEEN THE TWO ANTERIOR HORNS, KNOWN AS THE SEPTUM LUCIDUM (SEPTUM PELLUCIDUM), IS SEEN IN HORIZONTAL SECTION; ITS RIGHT AND LEFT LATERAL LAMINÆ (LAMINÆ SEPTI PELLUCIDI) ARE SEPARATED ONE FROM ANOTHER BY A MEDIAN CAVITY KNOWN AS THE VENTRICLE OF THE SEPTUM OR FIFTH VENTRICLE (CAVUM SEPTI PELLUCIDI).

¹ See note ¹ to p. 766.

² See Appendix, note 392.

³ *Choroidal Glomerulus*.—"The thickened margin of the velum interpositum projects freely on either side into the body of the lateral ventricle, forming the choroid plexus of that cavity, which extends along the posterior pillar of the fornix (crus fornicis) into the descending horn of the lateral ventricle; just before it enters the descending horn, the choroid plexus exhibits a considerable enlargement, the *glomus chorioideum*" (Von Langer and Toldt, *op. cit.*, p. 605). This structure is described neither by Quain nor by Macalister.

⁴ *Or ergot* (Morand).

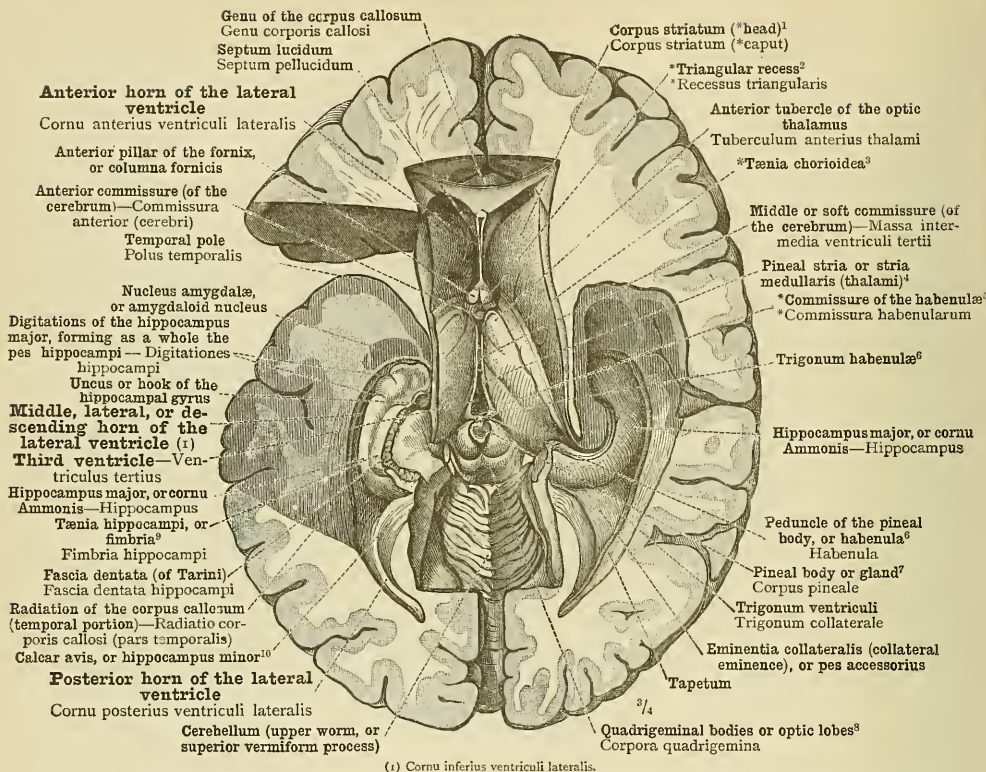


FIG. 1200.—THE UPPER PART OF THE CEREBRAL HEMISPHERES, THE CORPUS CALLOSUM OR GREAT COMMISSURE (TRAUS CEREBRI), THE FORNIX, AND THE VELUM INTERPOSITUM HAVING BEEN REMOVED, THE LATERAL VENTRICLES AND THE THIRD VENTRICLE WERE FULLY OPENED FROM ABOVE; AND THE QUADRIGEMINAL BODIES OR OPTIC LOBES (CORPORA QUADRIGEMINA—see note ⁶ to p. 760), THE PINEAL BODY OR GLAND (CORPUS PINEALE—see note ¹ below), AND ALSO THE UPPER WORM OR SUPERIOR VERMIFORM PROCESS (VERMIS SUPERIOR) OF THE CEREBELLUM, WERE EXPOSED TO VIEW.

FORMING THE OUTER WALL OF THE ANTERIOR HORN OF THE LATERAL VENTRICLE IS THE HEAD OF THE CAUDATE NUCLEUS (*CAPUT CORPORIS STRIATI—see note ¹ to p. 766); FORMING THE ANTERIOR WALL OF THE SAME IS THE GENU OF THE CORPUS CALLOSUM (GENU CORPORIS CALLOSI); AND FORMING THE INNER WALL OF THE SAME IS THE SEPTUM LUCIDUM (SEPTUM PELLUCIDUM), WHICH STRETCHES FORWARD FROM THE ANTERIOR PILLAR OF THE FORNIX (COLUMNÆ FORNICIS) TO THE GENU OF THE CORPUS CALLOSUM. IN THE FLOOR OF THE BODY (PARS CENTRALIS) OF THE LATERAL VENTRICLE IS SEEN THE UPPER OR DORSAL SURFACE OF THE OPTIC THALAMUS, THE STRIA TERMINALIS OR TÆNIA SEMICIRCULARIS (see *Appendix*, note ³⁰²), AND THE TAIL OF THE CAUDATE NUCLEUS (*CAUDA CORPORIS STRIATI—see note ¹ to p. 766). IN THE INNER WALL OF THE POSTERIOR HORN IS THE CALCAR AVIS OR HIPPOCAMPUS MINOR; WHILST IN THE LOWER WALL OF THE MIDDLE, LATERAL, OR DESCENDING HORN PROJECTS THE CONVEXITY OF THE HIPPOCAMPUS MAJOR, OR CORNU AMMONIS. IN THE LEFT HEMISPHERE, THE POSTERIOR PORTION OF THE FRONTAL LOBE HAS BEEN COMPLETELY REMOVED BY A FRONTAL SECTION; AND, MOREOVER, BY A SECTION IN THE DIRECTION OF THE LONG AXIS OF THE TEMPORAL LOBE, THE UPPER PORTION OF THIS LOBE HAS BEEN CUT AWAY, SO THAT THE NUCLEUS AMYGDALÆ OR AMYGDALOID NUCLEUS, SITUATE NEAR THE ANTERIOR EXTREMITY OF THE TEMPORAL LOBE, IS SEEN IN SECTION.

¹ See note ¹ to p. 766.

² See *Appendix*, note ³⁰².

³ This name is given by the author to the line of attachment of the outer layer of the choroid plexus of the lateral ventricle, adjacent to the *stria terminalis* or *tænia semicircularis*. See *Appendix*, note ³⁰².

⁴ Also called *tænia fornicis*. See *Appendix*, notes ³⁵⁹ and ³⁹².

⁵ Middle of the upper or dorsal portion of the *pedunculus corporis* or *habenula* (Quain), or *transverse fronsulum of the pineal body* (Macalister). See *Appendix*, note ³⁶⁵.

⁶ See *Appendix*, note ³⁶⁵.

⁷ Known also as the *conarium*, and as the *epiphysis cerebri*. See *Appendix*, note ³⁶⁵.

⁸ Called by Macalister *corpus fimbriatum*. See *Appendix*, note ³⁹².

⁹ See note ⁵ to p. 760.

¹⁰ Or *ergot* (Morand).

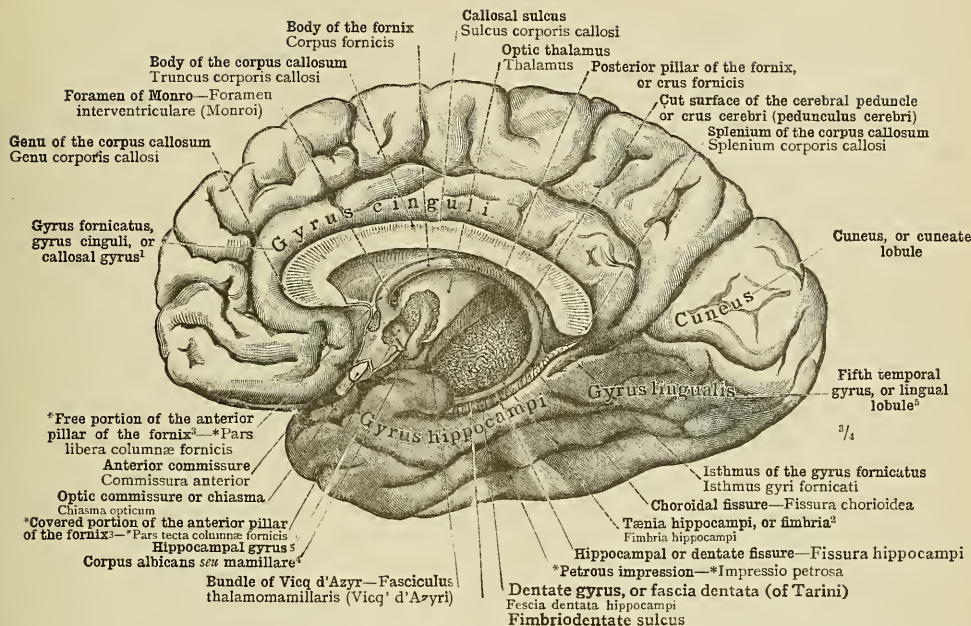


FIG. 1201.—THE INNER OR MESIAL SURFACE, FACIES MEDIALIS, OF THE RIGHT CEREBRAL HEMISPHERE. THE CEREBRAL PEDUNCLE OR CRUS CEREERI HAS BEEN DIVIDED TRANSVERSELY AS IT ENTERS THE HEMISPHERE. THE *GYRUS FORNICATUS (GRAND LOBE LIMBIQUE OF BROCA—see Appendix, note ³⁹⁰), CONSISTING OF THE GYRUS CINGULI OR CALLOSAL GYRUS (USUALLY ITSELF CALLED GYRUS FORNICATUS IN ENGLAND) AND THE GYRUS HIPPOCAMPI OR HIPPOCAMPAL GYRUS, THE TWO BEING CONNECTED BENEATH THE SPLENIUM OF THE CORPUS CALLOSUM BY THE ISTHMUS OF THE GYRUS FORNICATUS. THE GYRUS CINGULI OR CALLOSAL GYRUS SURROUNDS THE THREE PARTS OF THE CORPUS CALLOSUM OR GREAT COMMISSURE (TRAES CEREERI) WHICH IS SEEN IN MEDIAN SAGITTAL SECTION: THESE THREE PARTS ARE THE GENU, THE BODY (TRUNCUS), AND THE SPLENIUM. THE FORNIX IS SEEN IN ITS WHOLE LENGTH, THE LOWEST, *COVERED PORTION OF THE ANTERIOR PILLAR (*PARS TECTA COLUMNÆ FORNICIS—see Appendix, note ³⁹¹) HAVING BEEN EXPOSED BY THE PARTIAL REMOVAL OF THE LATERAL WALL OF THE THIRD VENTRICLE. BENEATH THE SPLENIUM OF THE CORPUS CALLOSUM, THE CONTINUITY OF THE POSTERIOR PILLAR OF THE FORNIX (CRUS FORNICIS) WITH THE TENIA HIPPOCAMPI OR FIMBRIA (FIMBRIA HIPPOCAMPI—see note ² below) IS MANIFEST. PARALLEL WITH THE FIMBRIA, BENEATH IT, AND SEPARATED FROM IT BY A SHALLOW GROOVE, THE FIMBRIODENTATE SULCUS, RUNS THE DENTATE GYRUS OR FASCIA DENTATA OF TARINI. BEHIND THE *COVERED PORTION OF THE ANTERIOR PILLAR OF THE FORNIX THE BUNDLE OF VICQ D'AZYR, WHICH CONNECTS THE CORPUS ALBICANS SEU MAMILLARE (OR BULE OF THE FORNIX) WITH THE OPTIC THALAMUS, HAS ALSO BEEN EXPOSED.

¹ See Appendix, note 390.

² See Appendix, note 394.

³ The fifth temporal gyrus or lingual lobule and the hippocampal gyrus together make up the uncinatus gyrus. The former is also known as the subcalcarine or infracalcarine gyrus, and the latter as the subiculum cornu Ammonis. See also Appendix, note 394.

⁴ Called by Macalister corpus fimbriatum. See Appendix, note 392.

⁵ Also known as the bulb of the fornix.

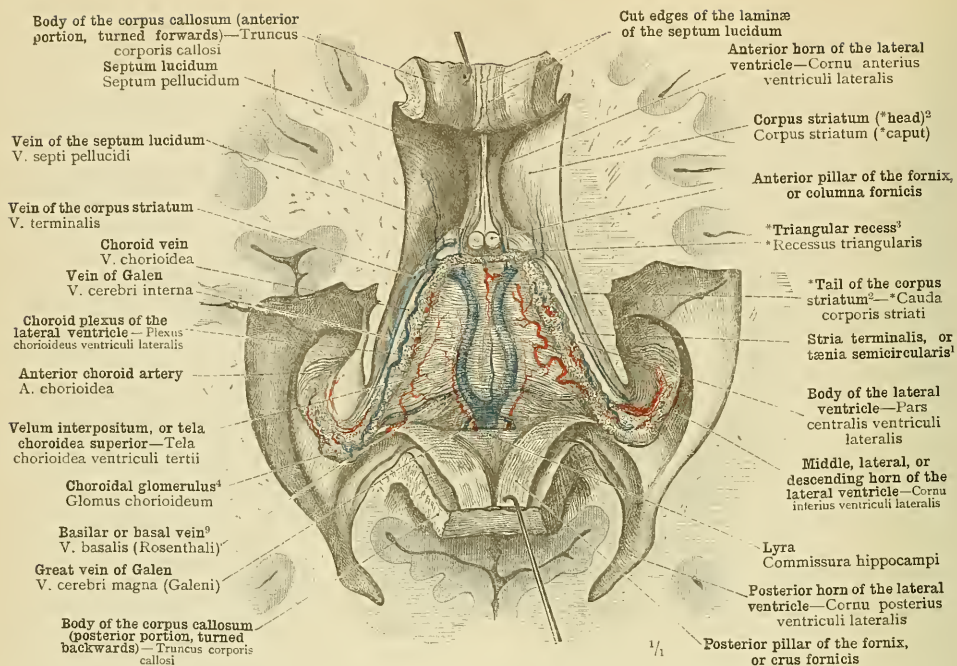
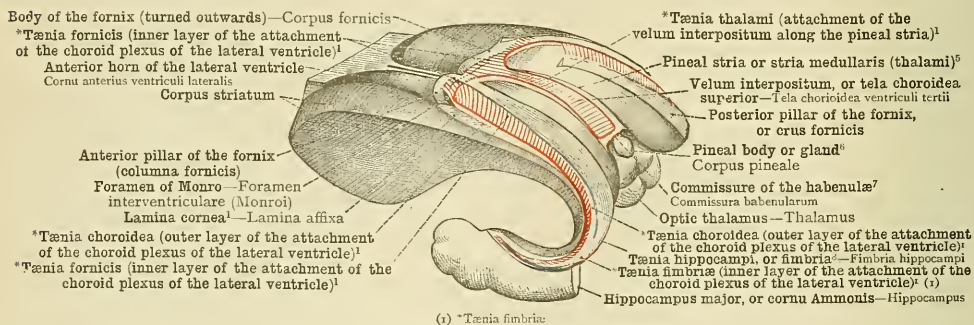


FIG. 1202.—THE VELUM INTERPOSITUM OR TELA CHORIOIDEA SUPERIOR (TELA CHORIOIDEA VENTRICULI TERTII), WITH THE CHOROID PLEXUSES OF THE LATERAL VENTRICLES (PLEXUS CHORIOIDEI VENTRICULORUM LATERALIVM), LAID BARE FROM ABOVE. THE LARGER BLOODVESSELS OF THE VELUM INTERPOSITUM AND THE CHOROID PLEXUSES HAVE BEEN RENDERED MORE CONSPICUOUS BY INJECTION



(1) *Tænia fimbriae

FIG. 1203.—THE LINES OF ATTACHMENT OF THE VELUM INTERPOSITUM AND THE CHOROID PLEXUSES OF THE LATERAL VENTRICLES (TÆNIA TELARUM)¹ IN THE PROSENCEPHALON AND THALAMENCEPHALON. DIAGRAMMATIC. THE RIGHT POSTERIOR PILLAR OF THE FORNIX HAS BEEN CUT THROUGH WITH THE VELUM INTERPOSITUM, AND ITS ANTERIOR PORTION HAS BEEN TURNED OUTWARDS. ON THE LEFT SIDE, ALSO, THE ANTERIOR PORTION OF THE FORNIX HAS BEEN DRAWN A LITTLE UPWARDS. SEEN OBLIQUELY FROM ABOVE AND THE LEFT SIDE.

¹ See Appendix, note 392.

² See note 1 to p. 766.

³ See Appendix, note 399.

⁴ See note 3 to p. 781.

⁵ Often known in England as the *tænia fornicis*. See Appendix, notes 399, 395, and 397.

⁶ Known also as the *conarium* and as the *epiphysis cerebri*. See Appendix, note 395.

⁷ Called by Macalister the *transverse foramen of the pineal body*. See Appendix, note 395.

⁸ Called by Macalister the *corpus fimbriatum*. See also Appendix, note 395.

⁹ See Appendix to Part V., note 397.

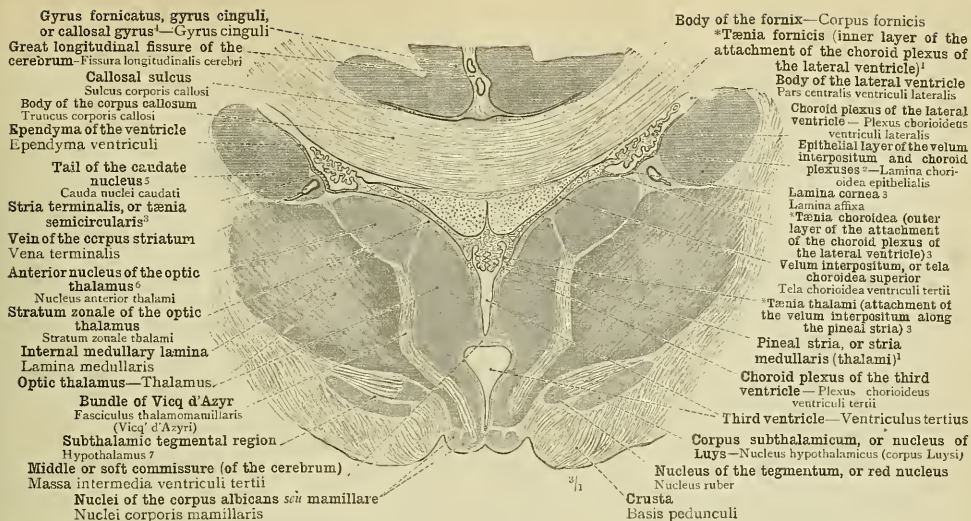


FIG. 1204.—CORONAL SECTION THROUGH THE MIDDLE OF THE THIRD VENTRICLE AND THE ADJOINING PARTS OF THE ENCEPHALON. THE VELUM INTERPOSITUM OR TELA CHOROIDEA SUPERIOR AND THE CHOROID PLEXUSES OF THE THIRD AND LATERAL VENTRICLES ARE SEEN IN TRANSVERSE SECTION. THE ATTACHMENT OF THE CHOROID PLEXUS OF THE LATERAL VENTRICLE TO THE OUTER FREE BORDER OF THE FORNIX BY MEANS OF THE *TERTIA FORNICIS¹; TO THE LAMINA CORNEA (LAMINA AFFIXA) AND THE EPENDYM OF THE LATERAL VENTRICLE BY MEANS OF THE *TERTIA CHOROIDEA (see Appendix, note 392); AND, FINALLY, THE ATTACHMENT OF THE LOWER SURFACE OF THE VELUM INTERPOSITUM TO THE PINEAL STRIA (STRIA MEDULLARIS THALAMI) BY MEANS OF THE TERTIA THALAMI.¹

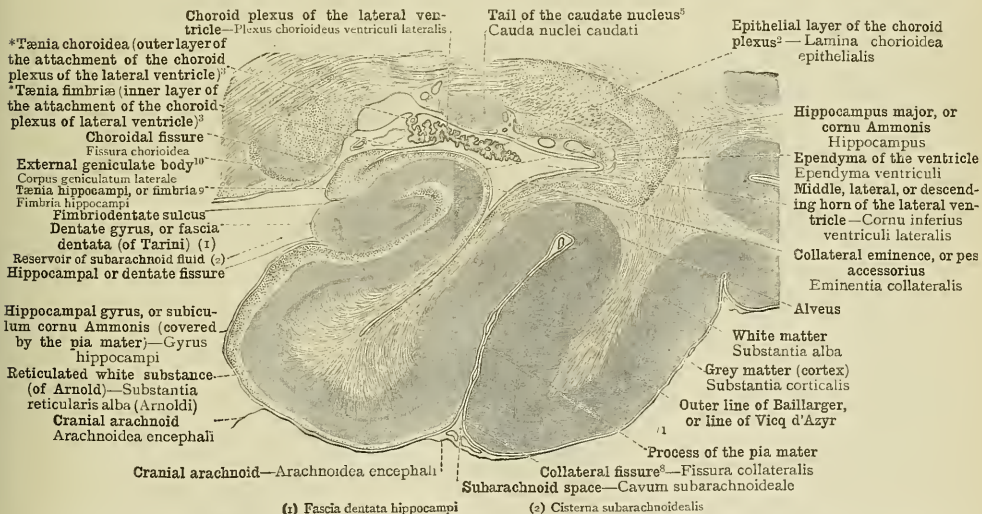


FIG. 1205.—CORONAL SECTION THROUGH THE MIDDLE, LATERAL, OR DESCENDING HORN OF THE RIGHT LATERAL VENTRICLE AND THE HIPPOCAMPAL GYRUS OR SUBICULUM CORNU AMMONIS. THE CHOROID PLEXUS IS SEEN IN TRANSVERSE SECTION. IT IS CONNECTED WITH THE EPENDYM OF THE DESCENDING HORN BY MEANS OF THE *TERTIA CHOROIDEA, AND WITH THE MARGIN OF THE TERTIA HIPPOCAMPI OR FIMBRIA (FIMBRIA HIPPOCAMPI OR CORPUS FIMBIATUM) BY MEANS OF THE *TERTIA FIMBRIÆ (see Appendix, note 392).

¹ See Appendix, note 392. The **tertia fornicis* of Todd must not be confused with the *tenuis fornicis* of English authors, the latter being also known as the *pinea stria*. See Appendix, notes 359 and 365.

² Or *epithelium of the plexus* (Quain). See Appendix, note 394.

³ See Appendix, note 392.

⁴ See Appendix, note 399.

⁵ See note 1 to p. 766.

⁶ Also known as the *nucleus of the anterior tubercle of the optic thalamus*.

⁷ See Appendix, note 354.

⁸ Sometimes regarded as the *fourth temporal sulcus*.

⁹ Called by Macalister the *corpus fimbriatum*. See Appendix, note 392.

¹⁰ Or lateral geniculate body.

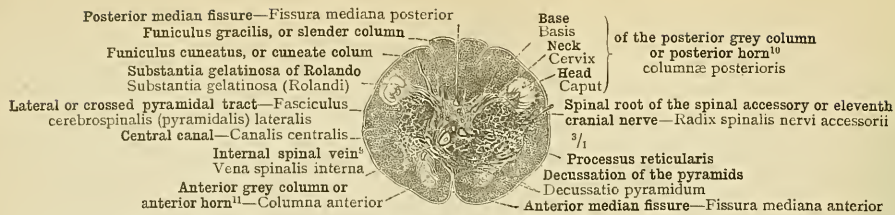


FIG. 1206.—TRANSVERSE SECTION THROUGH THE PYRAMIDAL DECUSSATION. LOWER OR CLOSED PART OF THE MEDULLA OBLONGATA.

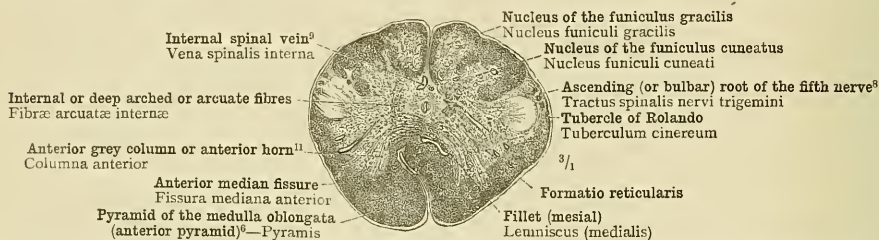


FIG. 1207.—TRANSVERSE SECTION THROUGH THE PYRAMIDS BELOW THE OLIVES. LOWER OR CLOSED PORTION OF THE MEDULLA OBLONGATA.

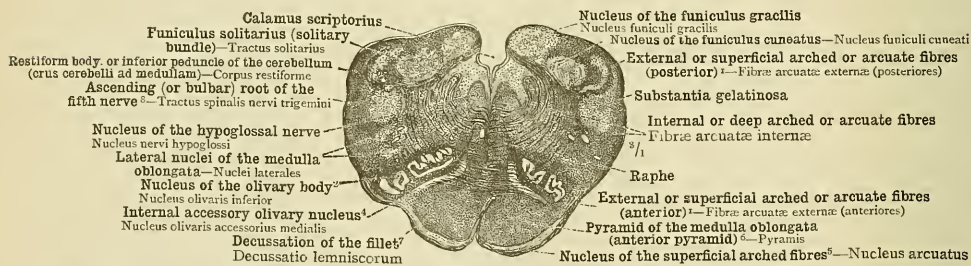


FIG. 1208.—TRANSVERSE SECTION THROUGH THE LOWER EXTREMITY OF THE OLIVARY BODY OR LOWER OLIVE. LOWER PART OF THE FLOOR OF THE FOURTH VENTRICLE (PARS INFERIOR FOSSE RHOMBOIDEÆ—see Appendix, note 355).

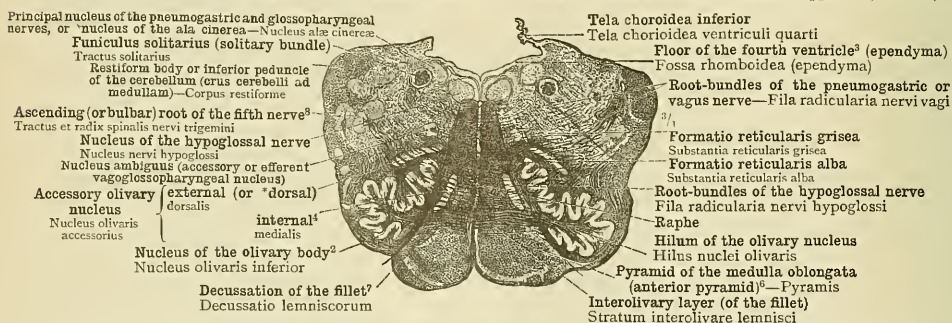


FIG. 1209.—TRANSVERSE SECTION THROUGH THE MIDDLE OF THE OLIVARY BODY OR LOWER OLIVE. LOWER PART OF THE FLOOR OF THE FOURTH VENTRICLE (PARS INFERIOR FOSSE RHOMBOIDEÆ—see Appendix, note 355).

TRANSVERSE SECTIONS THROUGH THE MEDULLA OBLONGATA. (THE WHITE MATTER IS SHADED, THE GREY MATTER UNSHADED.)

¹ See Appendix, note 393.

² Or (inferior) olivary nucleus; also known as the corpus dentatum of the olive. See Appendix, note 395.

³ See Appendix, note 355.

⁴ By Macalister called the nucleus arciformis.

⁵ Called by Gowers the lower root.

⁶ Or basis cornu posterioris, cervix cornu posterioris, and caput cornu posterioris.

⁷ Regarding the use of the term posterior grey column, see Appendix, note 339.

⁸ See Appendix, note 393.

⁹ See Appendix to Part V., note 298.

¹⁰ See Appendix, note 394.

¹¹ See Appendix, note 339.

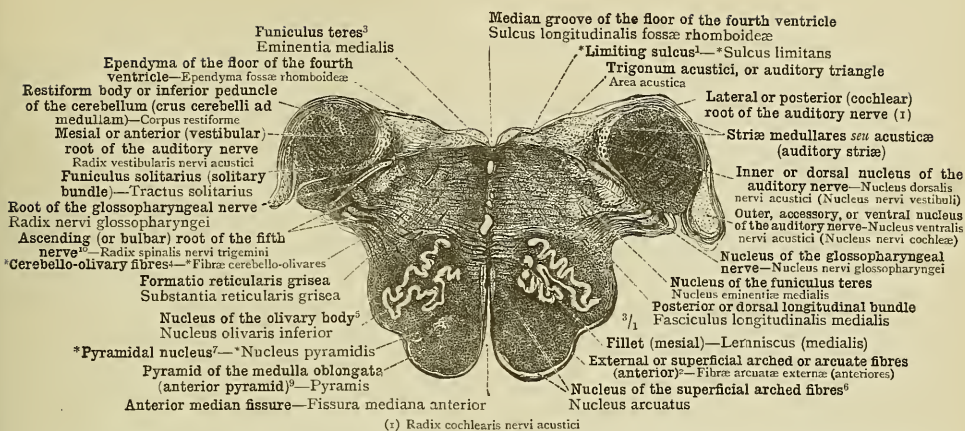


FIG. 1210.—TRANSVERSE SECTION THROUGH THE MEDULLA OBLONGATA, AT THE LEVEL OF THE UPPER EXTREMITY OF THE OLIVARY BODY OR LOWER OLIVE, TRAVERSING THE TRIGONUM ACUSTICI OR AUDITORY TRIANGLE, MIDDLE OR INTERMEDIATE PORTION OF THE FLOOR OF THE FOURTH VENTRICLE (PARS INTERMEDIA FOSSÆ RHOMBOIDEÆ—see Appendix, note 353).

The white matter is shaded, the grey matter unshaded.

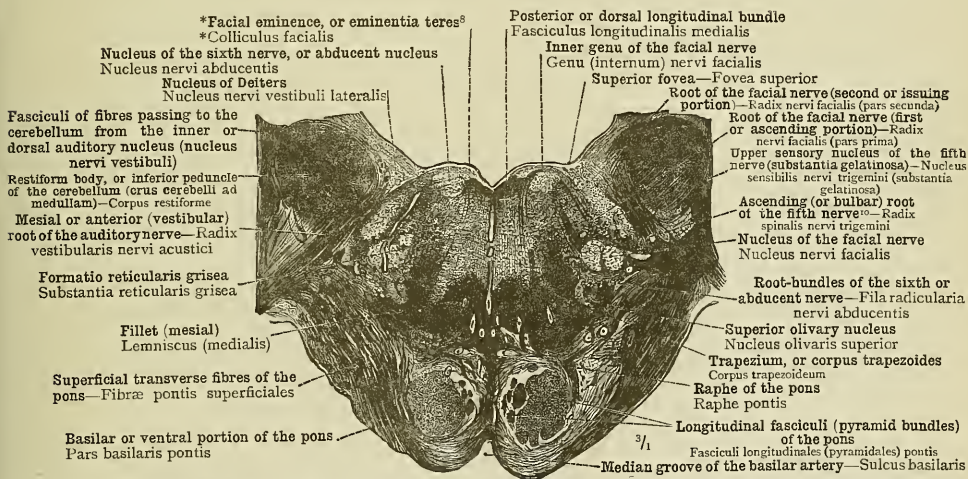


FIG. 1211.—TRANSVERSE SECTION THROUGH THE LOWER BORDER OF THE PONS VAROLII AND THE *FACIAL EMINENCE OR EMINENTIA TERES (*COLLICULUS FACIALIS—see Appendix, note 376). MIDDLE OR INTERMEDIATE PORTION OF THE FLOOR OF THE FOURTH VENTRICLE (PARS INTERMEDIA FOSSÆ RHOMBOIDEÆ—see Appendix, note 353).

The white matter is shaded, the grey matter unshaded.

¹ See Appendix, note 377.

² See Appendix, note 393.

³ See Appendix, note 396.

⁴ See Appendix, note 395.

⁵ Or (*inferior*) *olivary nucleus*; also known as the *corpus dentatum of the olive*. See Appendix, note 395.

⁶ By Macalister called *nucleus areiformis*.

⁷ See Appendix, note 397.

⁸ See Appendix, note 394.

⁹ See Appendix, note 363.

¹⁰ Called by Gowers the *lower root*.

Transverse Sections through the Brain.

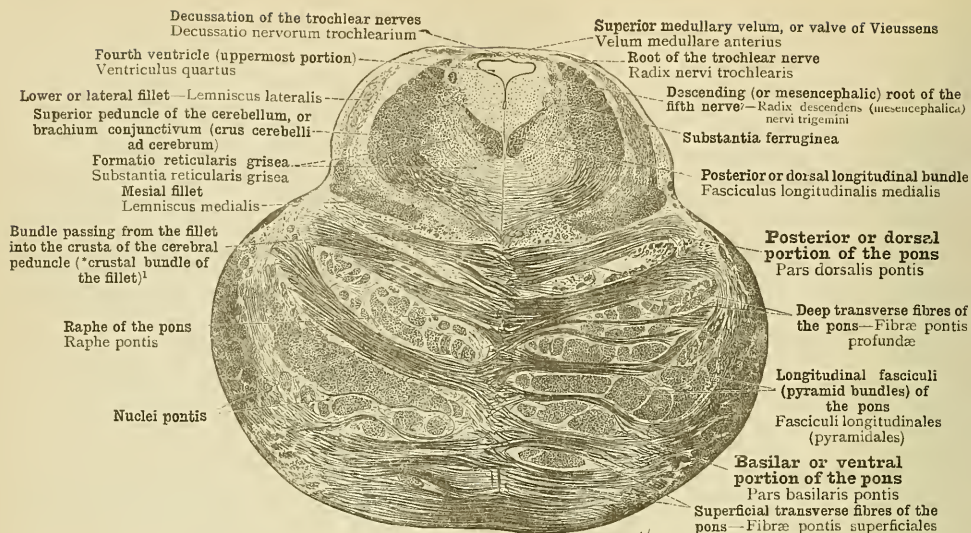


FIG. 1212.—TRANSVERSE SECTION THROUGH THE MIDDLE OF THE PONS VAROLII AND THE SUPERIOR MEDULLARY VELUM, OR VALVE OF VIEUSENS. *ISTHMUS RHOMBENCEPHALI (see *Appendix*, note 369); UPPER PORTION OF THE FLOOR OF THE FOURTH VENTRICLE (PARS SUPERIOR FOSSE RHOMBOIDEÆ—see *Appendix*, note 355).

White matter shaded, grey matter unshaded.

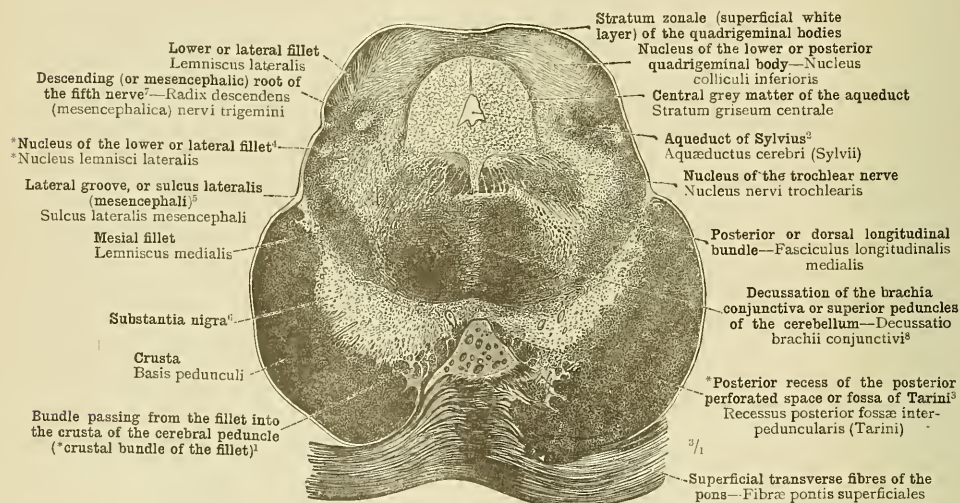


FIG. 1213.—TRANSVERSE SECTION THROUGH THE UPPER BORDER OF THE PONS VAROLII, PASSING THROUGH THE HINDMOST PORTION OF THE CRURA CEREBRI OR CEREBRAL PEDUNCLES AND THE LOWER OR POSTERIOR CORPORA QUADRIGEMINA. MID-BRAIN OR MESENCEPHALON.

White matter shaded, grey matter unshaded.

¹ See *Appendix*, note 397.

⁴ See *Appendix*, note 398.

² Or *iter a tertio ad quartum ventriculū*.

⁵ See *Appendix*, note 399.

³ See *Appendix*, note 392.

⁶ Called by Macalister the *locus niger*.

⁷ Called by Gowers the *upper root*.

⁸ See note ¹¹ to p. 772.

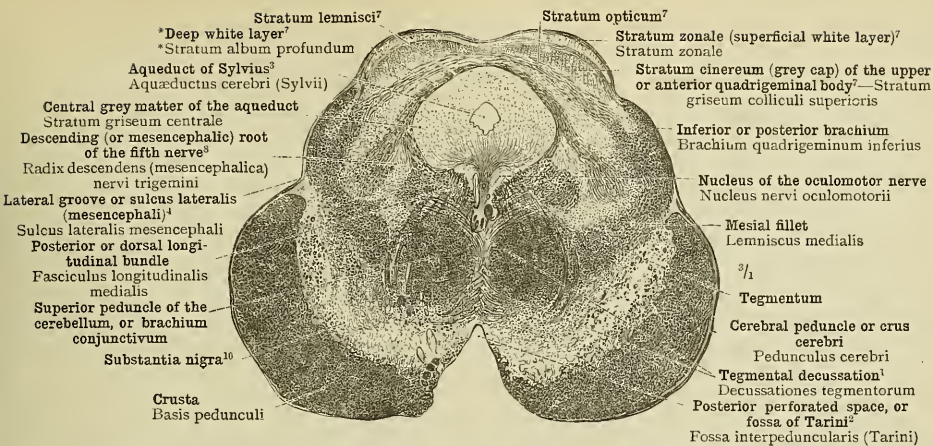


FIG. 1214.—TRANSVERSE SECTION THROUGH THE MIDDLE OF THE CEREBRAL PEDUNCLE OR CRUS CEREBRI, THROUGH THE TEGMENTUM, AND THROUGH THE UPPER OR ANTERIOR QUADRIGEMINAL BODIES. MID-BRAIN OR MESENCEPHALON.

White matter shaded, grey matter unshaded.

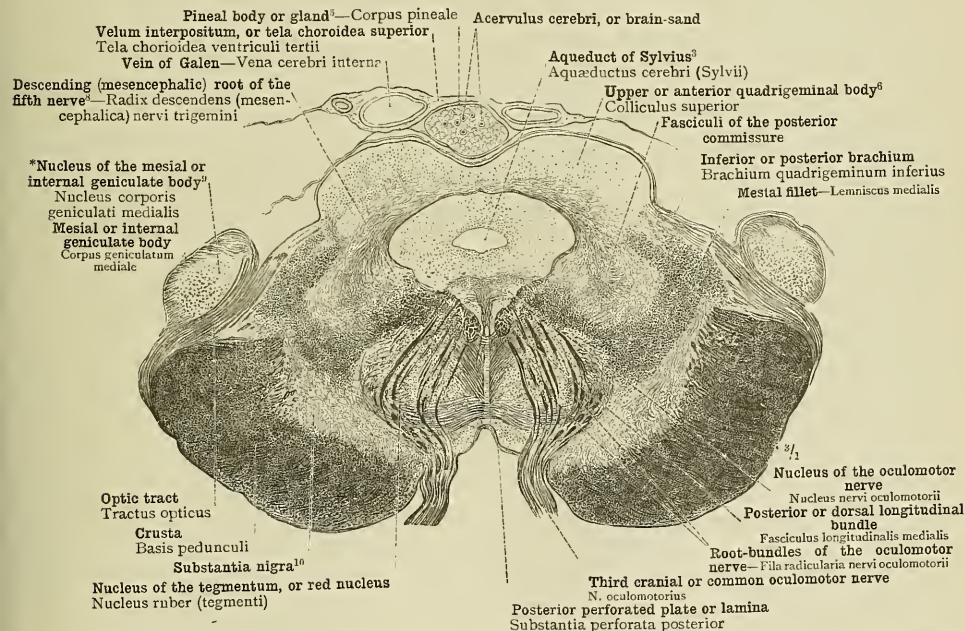


FIG. 1215.—TRANSVERSE SECTION THROUGH THE FRONT OF THE CEREBRAL PEDUNCLE OR CRUS CEREBRI, THROUGH THE NUCLEUS OF THE TEGMENTUM OR RED NUCLEUS, THROUGH THE UPPER OR ANTERIOR QUADRIGEMINAL BODIES AND THE PINEAL BODY OR GLAND (see note 3 below). MID-BRAIN OR MESENCEPHALON, ADJACENT TO THE INTERBRAIN OR THALAMENCEPHALON.

White matter shaded, grey matter unshaded.

1 See Appendix, note 399.

2 See Appendix, note 39a.

3 Or iter a tertio ad quartum ventriculum.

4 See Appendix, note 399.

5 Known also as the canarium and as the epiphysis cerebri.

6 See Appendix, note 395.

7 See Appendix, note 400.

8 Called by Gowers the upper root.

9 See Appendix, note 397.

10 Nuclei of the Geniculate Bodies.—The grey matter in the interior of the geniculate bodies is called by Tolbt the nuclei of these bodies. The name is not used by Quain.

11 Called by Macalister the locus niger.

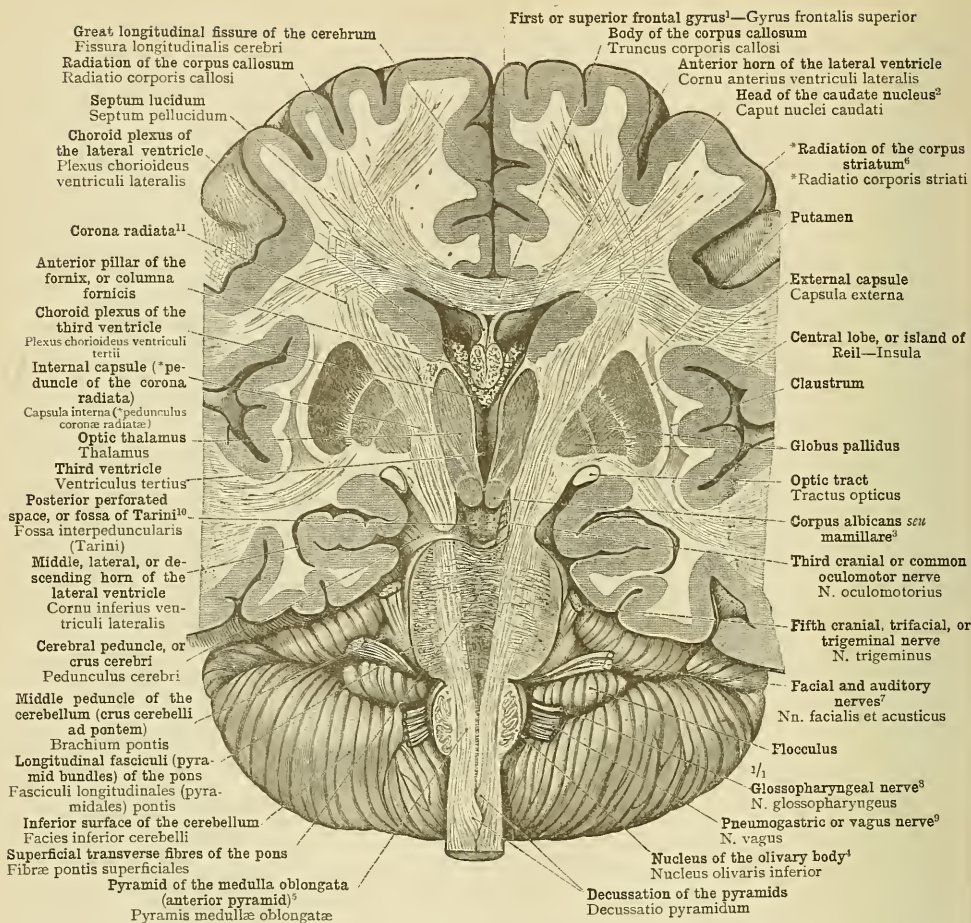


FIG. 1216.—TRANSVERSE SECTION THROUGH THE BRAIN IN THE DIRECTION OF THE MEDULLA OBLONGATA AND THE CEREBRAL PEDUNCLES OR CRURA CEREbRI. THE COURSE OF THE PYRAMIDAL TRACT FROM THE DECUSSATION OF THE PYRAMIDS UPWARDS, THROUGH THE PYRAMID OF THE MEDULLA OBLONGATA (ANTERIOR PYRAMID—see Appendix, note ³⁶³), THE PONS VAROLII, AND THE CRUSTA OF THE CEREBRAL PEDUNCLE OR CRUS CEREbRI, INTO THE INTERNAL CAPSULE, WHERE IT ENTERS THE *PEDUNCLE OF THE CORONA RADIATA, PEDUNCULUS CORONAE RADIATAE. IN THE MEDULLARY CENTRE OR WHITE MATTER OF THE CEREBRUM (MEDITULLUM), WE SEE THE INTERCLACEMENT OF THE RADIATION OF THE CORPUS CALLOSUM (RADIATIO CORPORIS CALLOSI) WITH THE FIBRES OF THE CORONA RADIATA AS THEY DIVERGE FROM THE INTERNAL CAPSULE, AND WITH THE FIBRES OF THE *RADIATION OF THE CORPUS STRIATUM (RADIATIO CORPORIS STRIATI—see Appendix, note ⁴⁰¹).

¹ See Appendix, note ³⁸⁸.

² See note ¹ to p. 766.

³ Also known as the *bulb of the fornix*.

⁴ Or (*inferior*) *olivary nucleus*; also known as the *corpus dentatum of the olive*. See Appendix, note ³⁶⁵.

⁵ See Appendix, note ³⁶³.

⁶ See Appendix, note ⁴⁰¹.

⁷ In Soemmerring's enumeration, the *facial* is the *seventh*, the *auditory* the *eighth* cranial nerve; in that of Willis the former is the *seventh* *diversa*, the latter the *fortio mollis*, of the *seventh* cranial nerve.

⁸ *Ninth* cranial nerve in Soemmerring's enumeration; *first* trunk of the *eighth* cranial nerve in that of Willis.

⁹ *Tenth* cranial nerve in Soemmerring's enumeration; *second* trunk of the *eighth* cranial nerve in that of Willis.

¹⁰ See Appendix, note ³⁶⁴.

¹¹ Or *fibrous cone* (Mayo).

Transverse Section through the Brain.

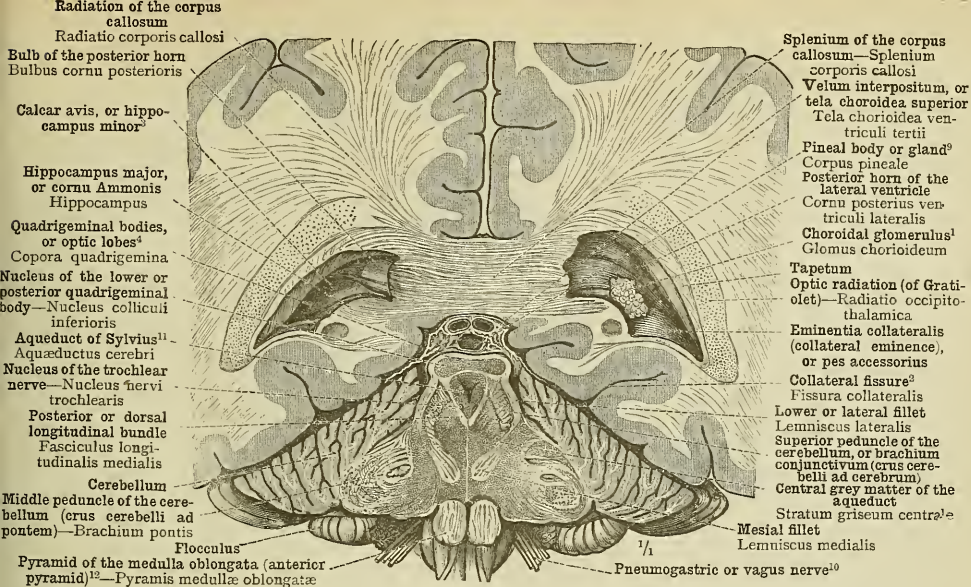


FIG. 1217.—CORONAL SECTION, PASSING BEHIND THE PONS VAROLII, THROUGH THE UPPER EXTREMITIES OF THE PYRAMIDS AND THROUGH THE SPLENIUM OF THE CORPUS CALLOSUM. ANTERIOR SURFACE OF POSTERIOR SEGMENT. A VIEW IS OBTAINED INTO THE POSTERIOR HORNS OF THE LATERAL VENTRICLES.

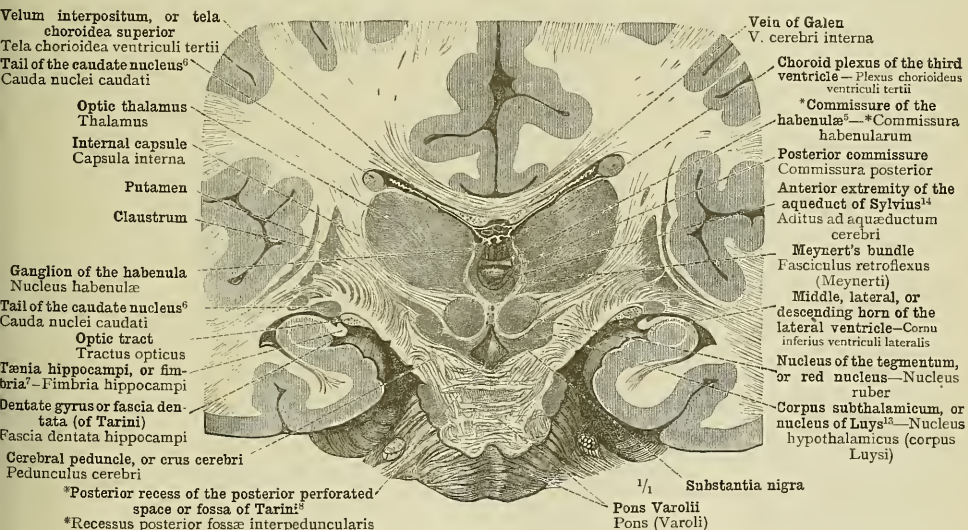


FIG. 1218.—CORONAL SECTION, PASSING THROUGH THE ANTERIOR PORTION OF THE PONS VAROLII, THE OPTIC THALAMI, AND THE POSTERIOR EXTREMITY OF THE LENTICULAR NUCLEUS. ANTERIOR SURFACE OF POSTERIOR SEGMENT. A VIEW IS OBTAINED OF THE POSTERIOR WALL OF THE THIRD VENTRICLE. THE CENTRAL PORTION OF BODY AND THE MIDDLE, LATERAL, OR DESCENDING HORN OF THE LATERAL VENTRICLE ARE CUT ACROSS BY THE SECTION.

¹ See note 3 to p. 781.
² Or *ergot* (Morand).
³ Middle of the upper or dorsal portion of the pedunculus conarii or habenula (Quain), or transverse frænum of the pineal body (Macalister). See Appendix, note 35.
⁴ Called by Macalister the corpus fimbriatum. See Appendix, note 39.
⁵ Known also as the conarium and as the epiphysis cerebri. See Appendix, note 35.
⁶ Tenth cranial nerve in Soemmerring's enumeration; second trunk of the eighth cranial nerve in that of Willis.
⁷ Or *Iter a tertio ad quartum ventriculum*.
⁸ See Appendix, note 35.
⁹ See Appendix, note 35.
¹⁰ See Appendix, note 40.
¹¹ See Appendix, note 35.
¹² See Appendix, note 35.

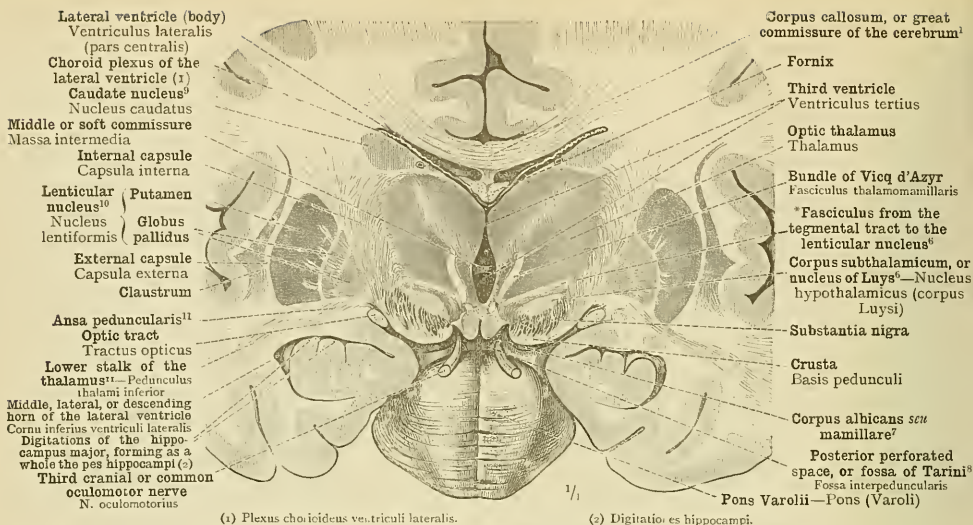


FIG. 1219.—CORONAL SECTION IN FRONT OF THE PONS, PASSING THROUGH THE CRURA CEREBRI OR CEREBRAL PEDUNCLES AND THE CORPORA MAMILLARIA SEU ALBICANTIA. ANTERIOR SURFACE OF POSTERIOR SEGMENT. THE THIRD VENTRICLE IS CUT ACROSS, ALSO THE BODY AND THE DESCENDING HORN OF THE LATERAL VENTRICLE; THE DESCENDING HORN IS DIVIDED CLOSE TO ITS ANTERIOR EXTREMITY.

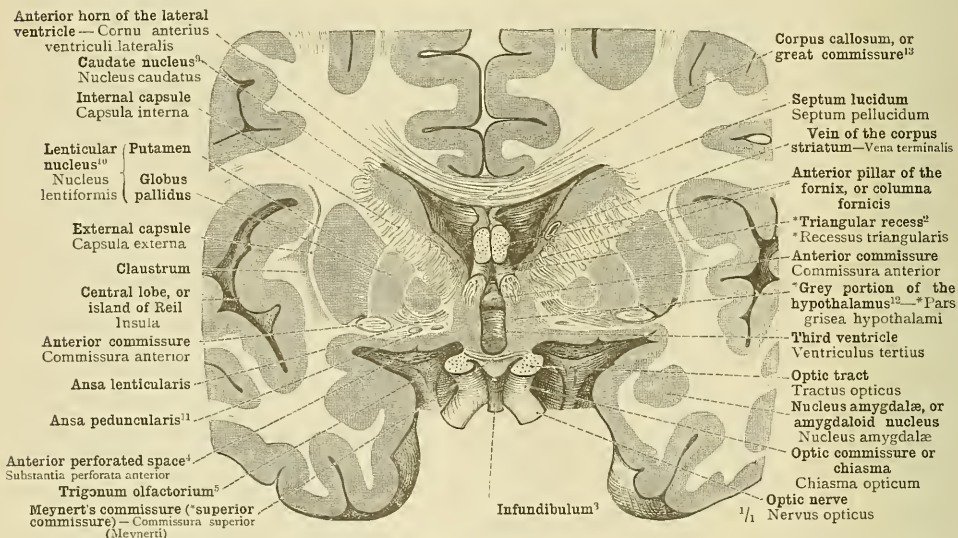


FIG. 1220.—CORONAL SECTION BEHIND THE OPTIC COMMISSURE OR CHIASSMA, PASSING THROUGH THE INFUNDIBULUM AND THE ANTERIOR PILLARS OF THE FORNIX OR COLUMNÆ FORNICIS. POSTERIOR SURFACE OF ANTERIOR SEGMENT. A VIEW IS OBTAINED OF THE INTERIOR OF THE ANTERIOR HORNS OF THE LATERAL VENTRICLES, AND THE ANTERIOR WALL OF THE THIRD VENTRICLE IS DISPLAYED.

¹ Formerly known as *trabs cerebri*.

² See Appendix, note 3⁶.

³ See Appendix, note 3⁶.

⁴ The grey matter forming the floor of the anterior perforated space is distinguished by the name of the anterior perforated plate or lamina.

⁵ See Appendix, note 3⁶.

⁶ See Appendix, note 4⁰.

⁷ Sometimes called the bulb of the fornix.

⁸ See Appendix, note 3⁶.

⁹ Or intraventricular portion (or nucleus) of the corpus striatum. See note ¹ to p. 766.

¹⁰ Or extraventricular portion (or nucleus) of the corpus striatum. See note ¹ to p. 766.

¹¹ Quain uses the term *ansa peduncularis* and lower stalk of the thalamus as synonymous. Fig. 1219 shows that the two form a continuous strand of fibres.

¹² See Appendix, note 4³.

¹³ Formerly called *trabs cerebri*.

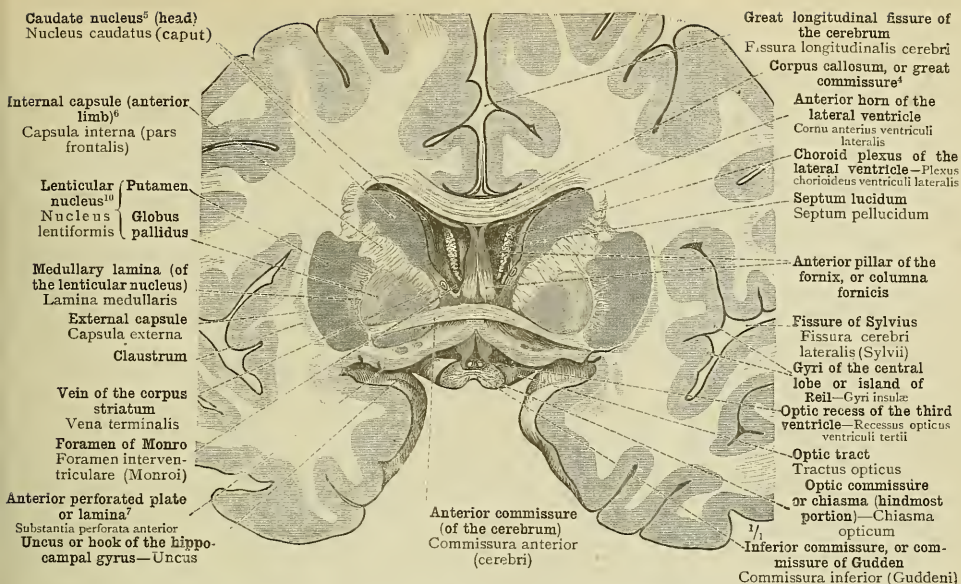


FIG. 1221.—CORONAL SECTION PASSING THROUGH THE OPTIC COMMISSURE OR CHIASSA AND THROUGH THE ANTERIOR COMMISSURE OF THE CEREBRUM. ANTERIOR SURFACE OF POSTERIOR SEGMENT. A VIEW IS OBTAINED INTO THE THIRD VENTRICLE FROM BEFORE.

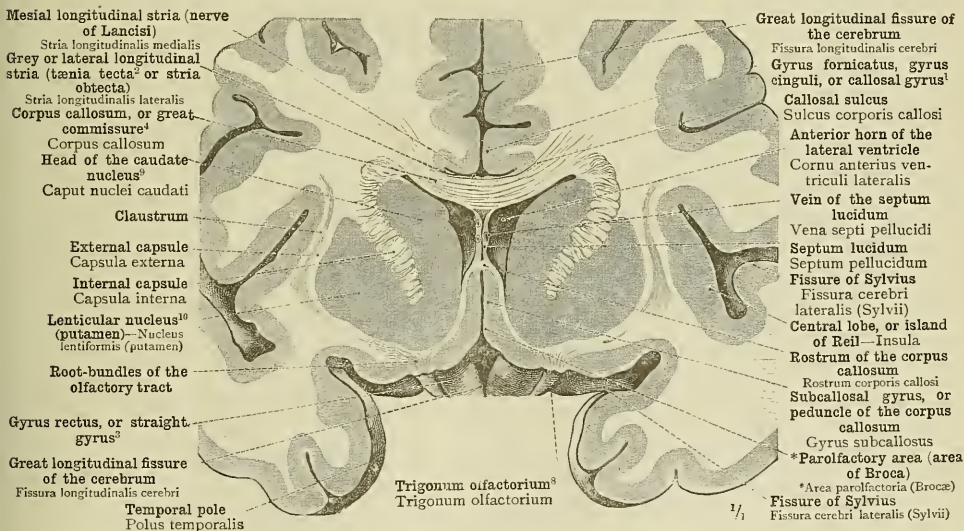


FIG. 1222.—CORONAL SECTION PASSING IN FRONT OF THE ANTERIOR COMMISSURE OF THE CEREBRUM AND THROUGH THE ANTERIOR EXTREMITIES OF THE CAUDATE AND LENTICULAR NUCLEI (see note ¹ to p. 766). POSTERIOR SURFACE OF ANTERIOR SEGMENT. A VIEW IS OBTAINED OF THE ANTERIOR WALLS OF THE ANTERIOR HORNS OF THE LATERAL VENTRICLES.

¹ See Appendix, note 399.

² See Appendix, note 399.

³ See Appendix, note 397.

⁴ Formerly called *trabs cerebri*.

⁵ Also called the *interventricular portion* (or *nucleus*) of the *corpus striatum*. See note ¹ to p. 766.

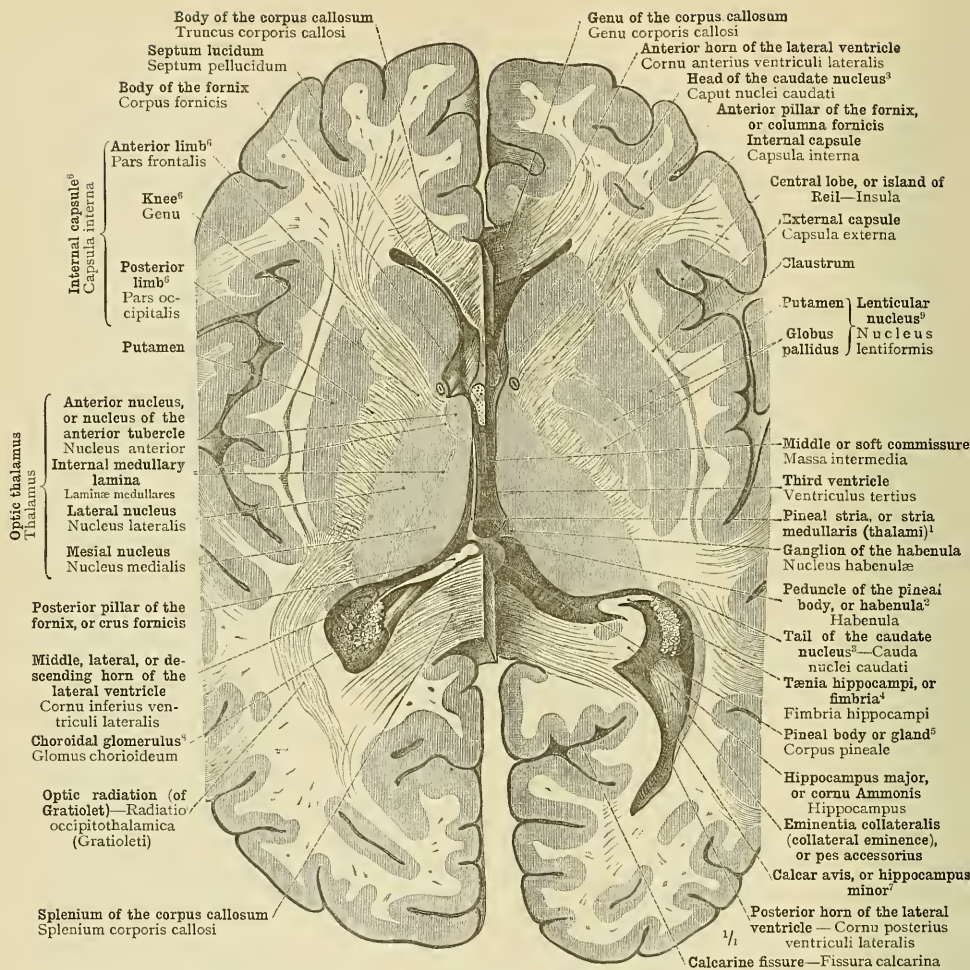
⁶ See Appendix, note 404.

⁷ I.e., the grey matter forming the floor of the *anterior perforated space*.

⁸ See Appendix, note 393.

⁹ See note ¹ to p. 766.

¹⁰ Also called the *extraventricular portion* (or *nucleus*) of the *corpus striatum*. See note ¹ to p. 766.



¹ Also called *tenuia fornicis*. See Appendix, notes 3⁷⁹ and 3⁸².

² See note 1 to p. 766.

³ Called by Macalister the *corpus fimbriatum*. See Appendix, note 3⁸².

⁴ Known also as the *conarium* and as the *chiphysis cerebri*. See Appendix, note 3⁸¹.

⁵ See Appendix, note 4⁰⁴.

⁶ Or *ergot* (Morand).

⁷ See note 3 to p. 781.

⁸ Also called the *extraventricular portion* (or *nucleus*) of the *corpus striatum*. See note 1 to p. 766.

FIG. 1223.—ON THE RIGHT SIDE OF THE BRAIN THE PLANE OF SECTION IS ABOUT 1·5 CENTIMETRES (0·6 INCH) DEEPER THAN ON THE LEFT SIDE. WHILST, THEREFORE, ON THE LEFT SIDE THE OPTIC THALAMUS AND THE CAUDATE AND LENTICULAR NUCLEI ARE CUT ACROSS NEAR THEIR SUMMITS, ON THE RIGHT SIDE THESE BODIES ARE DIVIDED A LITTLE BELOW THE MIDDLE OF THEIR VERTICAL EXTENT, AND THE DIVISION OF THE LENTICULAR NUCLEUS INTO THREE ZONES IS DISPLAYED. ON THE LEFT SIDE THE COMMON ENTRANCE TO THE POSTERIOR AND MIDDLE (LATERAL OR DESCENDING) HORNS OF THE LATERAL VENTRICLE, WITH THE CHOROIDAL GLOMERULUS (see note 3 to p. 781), APPEARS IN THE PLANE OF SECTION, WHILST ON THE RIGHT SIDE THE POSTERIOR HORN IS DIVIDED ALONG ITS LONG AXIS, AND THE MIDDLE HORN IS CUT ACROSS OBQUELY. ON BOTH SIDES THE INTERNAL CAPSULE OF THE LENTICULAR NUCLEUS, CAPSULA LENTIS INTERNA, IS SEEN IN HORIZONTAL SECTION, ITS KNEE, GENU, AND ITS ANTERIOR AND POSTERIOR LIMES, PARS FRONTALIS ET PARS OCCIPITALIS, BEING DISPLAYED (see Appendix, note 4⁰⁴). THE EXTERNAL CAPSULE OF THE LENTICULAR NUCLEUS, CAPSULA LENTIS EXTERNA, AND THE CLAUSTRUM ARE ALSO SHOWN. SEEN FROM ABOVE.

Horizontal Section through the Cerebrum.

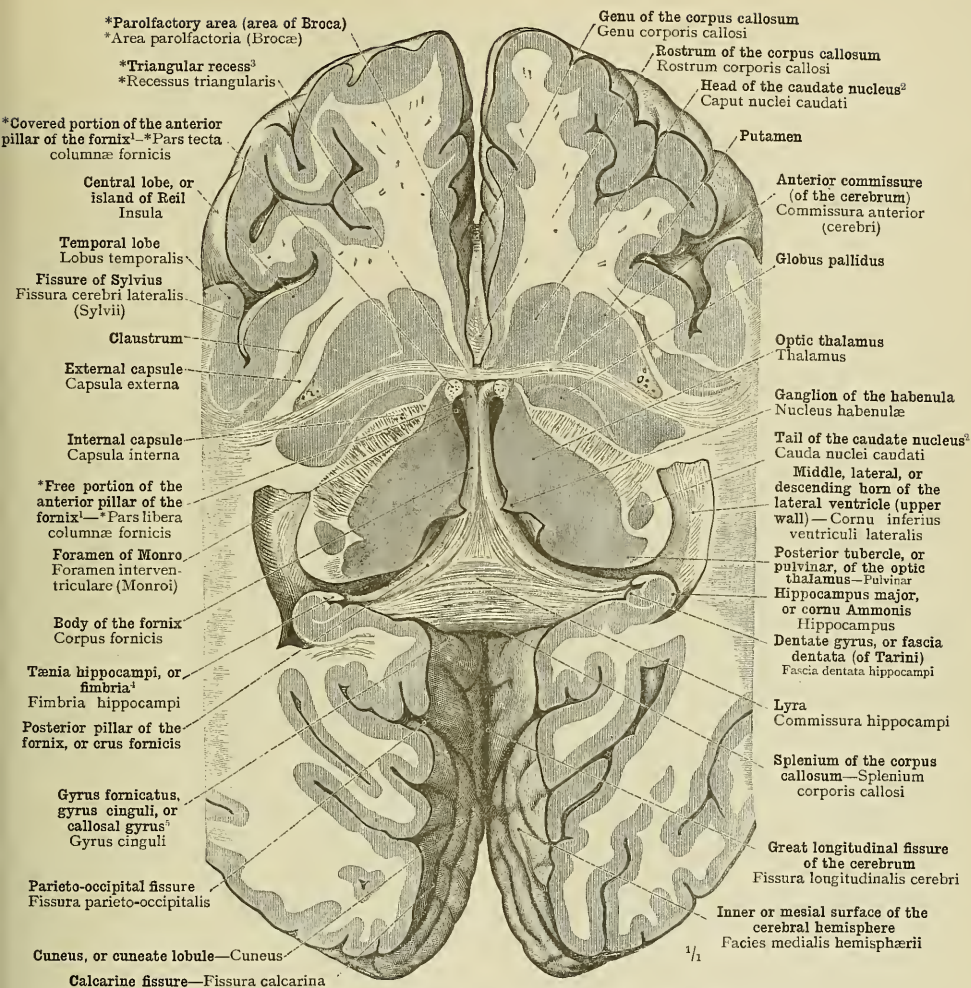
¹ See Appendix, note 394.² See note 1 to p. 766.⁴ Called by Macalister *corpus fimbriatum*. See Appendix, note 392.³ See Appendix, note 399.⁵ See Appendix, note 392.

FIG. 1224.—THE PLANE OF THE SECTION IS THAT OF THE ANTERIOR COMMISSURE OF THE CEREBRUM, AND THE LOWER SURFACE OF THE UPPER SEGMENT IS DEPICTED, AS SEEN FROM BELOW. THE OPTIC THALAMI AND THE CAUDATE AND LENTICULAR NUCLEI ARE CUT ACROSS NEAR THEIR INFERIOR EXTREMITIES; THE LOWER FREE SURFACES OF THE FORNIX AND THE CORPUS CALLOSUM ARE DISPLAYED. THE HIPPOCAMPUS MAJOR OR CORNU AMMONIS IS CUT ACROSS ALMOST TRANSVERSELY NEAR ITS POSTERIOR EXTREMITY; PART OF THE UPPER WALL OF THE POSTERIOR HORN OF THE LATERAL VENTRICLE IS DISPLAYED. THE ANTERIOR COMMISSURE IS SHOWN IN ITS ENTIRE LENGTH, AND IS SEEN AT EITHER SIDE OF THE SECTION TO PASS INTO THE WHITE MATTER OR MEDULLARY CENTRE OF THE TEMPORAL LOBE.

Horizontal Section through the Cerebrum.

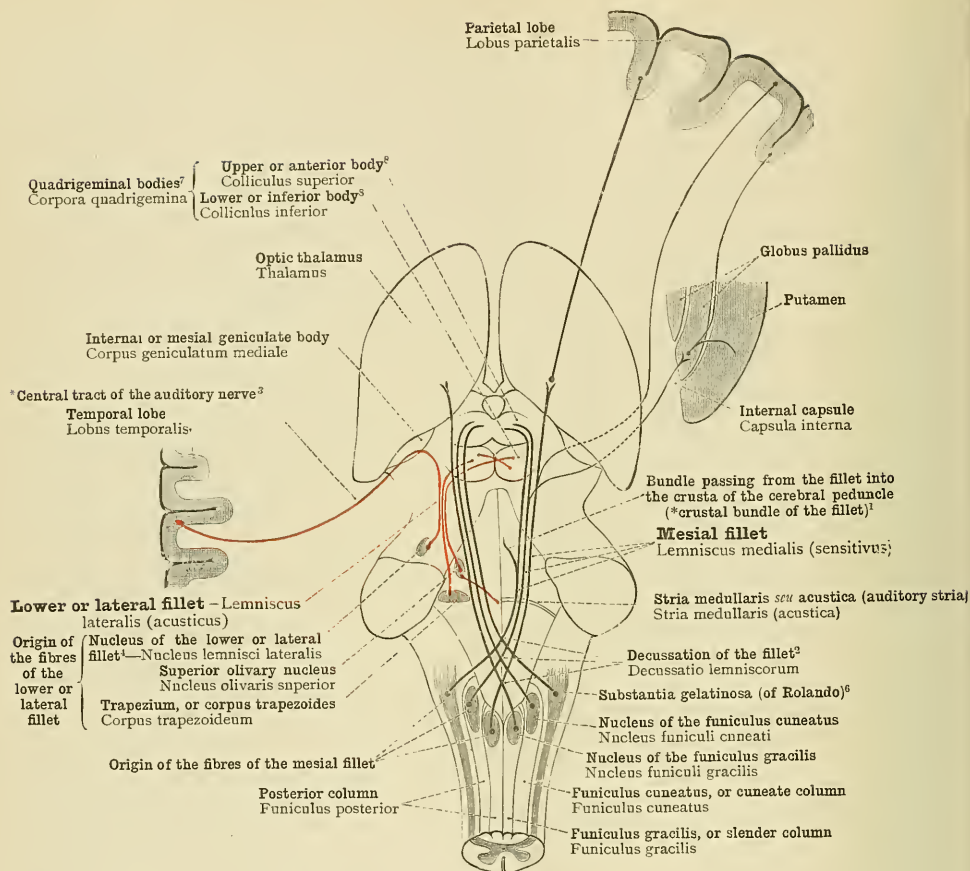


FIG. 1225.—DIAGRAMMATIC REPRESENTATION OF THOSE TRACTS OF THE POSTERIOR COLUMN OF THE SPINAL CORD WHICH REACH THE CEREBRUM WITHOUT PASSING THROUGH THE CEREBELLUM (TRACT OF THE FILLET, OR FILLET PORTION OF THE TEGMENTAL TRACT OR TEGMENTAL SYSTEM⁵). THE COURSE OF THE MESIAL FILLET IS INDICATED BY BLACK LINES, THAT OF THE LOWER OR LATERAL FILLET BY RED LINES.

Regarding the course of the fibres of the cerebral hemisphere, as displayed in Figs. 1225 to 1231, see Appendix. note 465.

¹ See Appendix, notes 397 and 405.

² See Appendix, note 394.

³ *Central Tract of the Auditory Nerve.—In their account of the fillet, after describing the *triangle of the fillet (*trigonom lemnisci—see Appendix, note 395) and the so-called nucleus of the fillet (Schleifenkern—see Appendix, note 395), Von Langer and Tokit proceed as follows (*op. cit.*, p. 657): “The lateral fillet is reinforced by fibres proceeding from the auditory stria (stria medullaris seu acustica) of the opposite side. The indirect upward prolongation of these fibres passes through the brachium of the lower quadrigenal body into the mesial geniculate body, and thence it is continued to the cortex of the temporal lobe. This is the *central tract of the auditory nerve” (*centrale Bahn des nervus acusticus*).

⁴ See Appendix, note 395.

⁵ See Appendix, note 405.

⁶ The grey matter of the funiculus of Rolando.

⁷ See note 3 to p. 750.

⁸ See Appendix, note 372.

Decursus fibrarum cerebraliū—The course of the fibres of the brain.

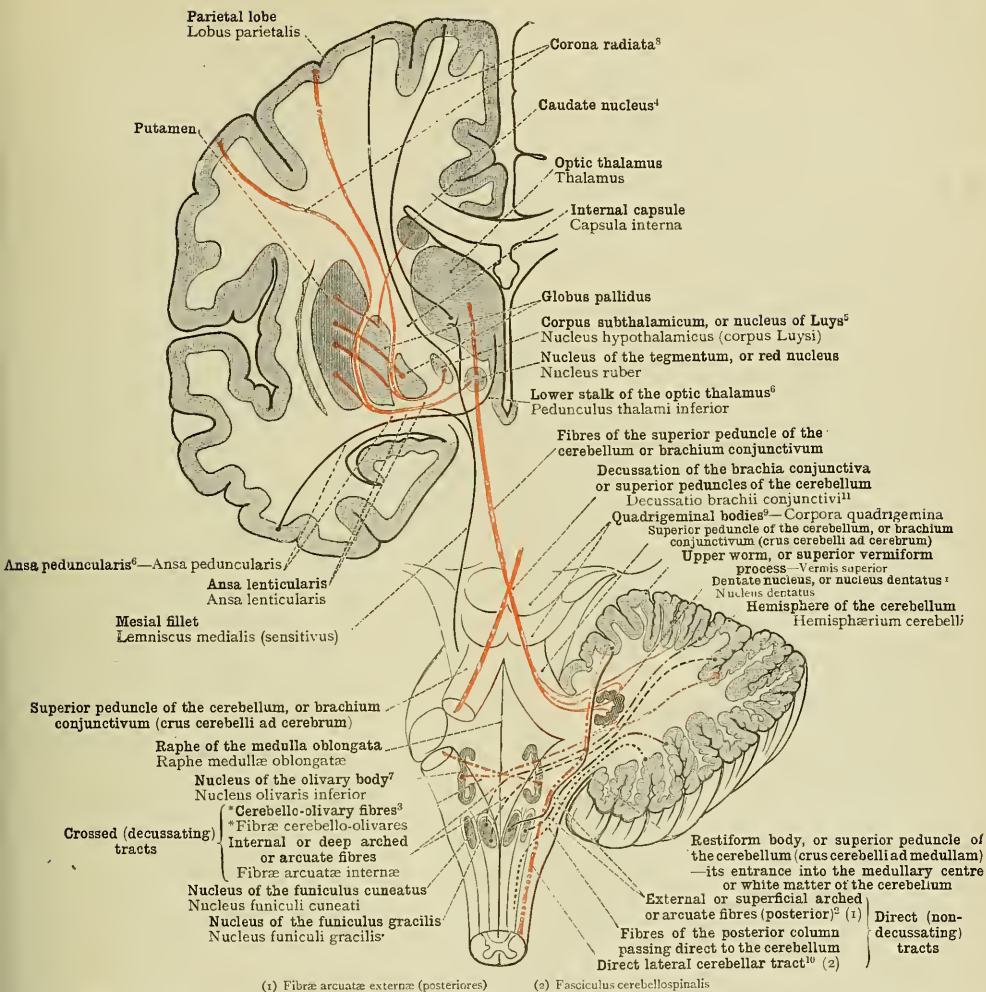


FIG. 1226.—DIAGRAMMATIC REPRESENTATION OF THOSE TRACTS OF THE POSTERIOR COLUMN OF THE SPINAL CORD WHICH PASS THROUGH THE RESTIFORM BODIES INTO THE CEREBELLUM OR PASS THROUGH THE CEREBELLUM ON THEIR WAY TO THE CEREBRUM (DORSAL OR CEREBELLAR PORTION OF THE TEGMENTAL TRACT—see Appendix, note 405), AND FIBRES PASSING DIRECT FROM THE POSTERIOR COLUMN TO THE CEREBELLUM. THE DIRECT LATERAL CEREBELLAR TRACT.

¹ Known also as the *corpus acenatum* or *corpus ciliare*.

² See Appendix, note 393.

³ See Appendix, note 393.

⁴ Also known as the *intraventricular portion* (or *nucleus*) of the *corpus striatum*. See note ¹ to p. 766.

⁵ See Appendix, note 402.

⁶ See note ¹¹ to p. 792.

⁷ Or (*inferior*) *olivary nucleus*; also known as the *corpus dentatum* of the olive. See Appendix, note 385.

⁸ Or *fibræ cone* (Mayo).

⁹ See note ⁵ to p. 760.

¹⁰ See Appendix, note 394.

¹¹ See note ¹¹ to p. 772.

Decursus fibrarum cerebralium—The course of the fibres of the brain.

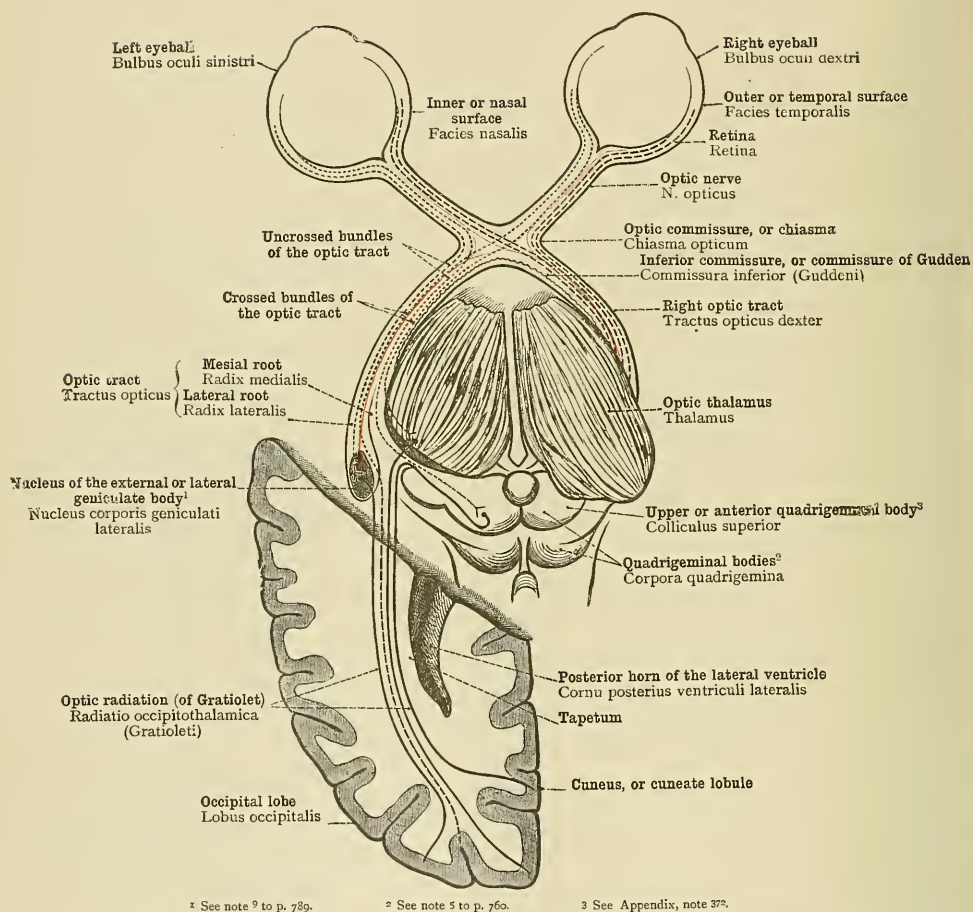
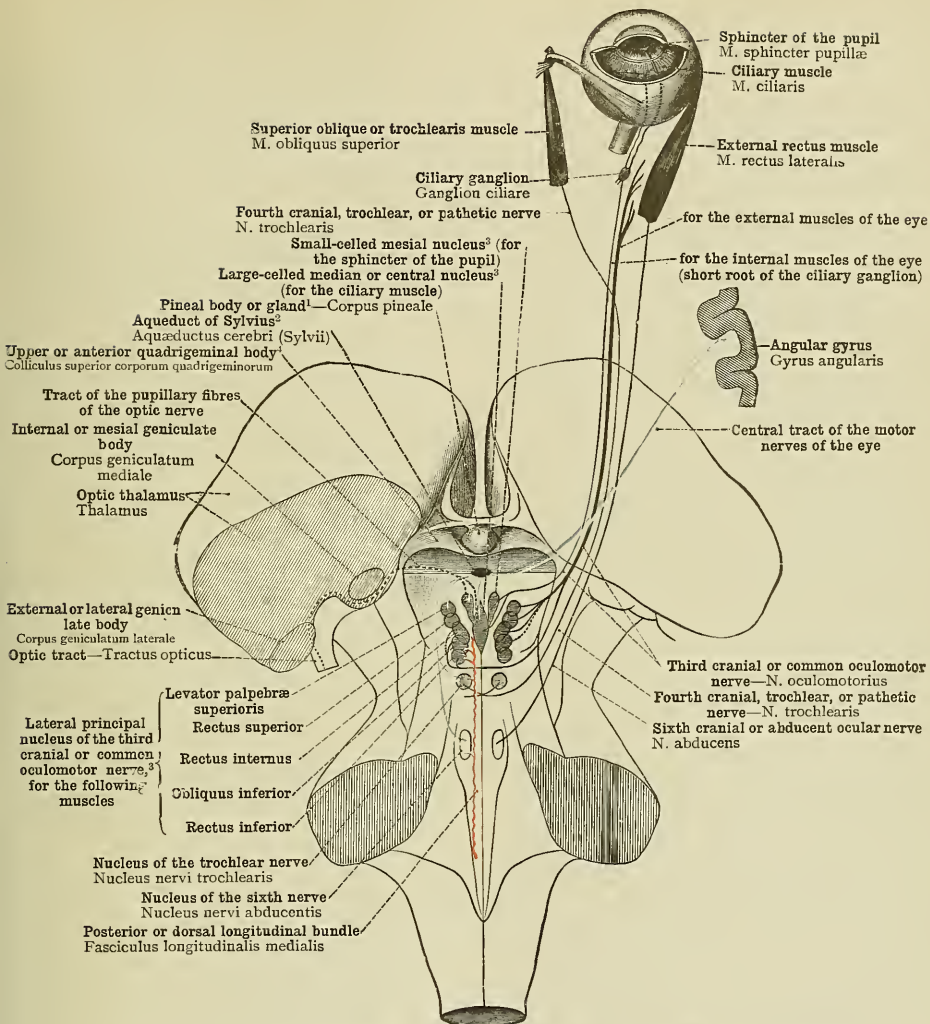


FIG. 1227.—DIAGRAMMATIC REPRESENTATION OF THE COURSE OF THE FIBRES OF THE OPTIC NERVE THROUGH THE OPTIC COMMISSURE OR CHIASSMA, AND OF THE CENTRAL PATHS OF CONDUCTION OF VISUAL IMPULSES. THE FASCICULI PROCEEDING FROM THE MACULA LUTEA, SOME OF WHICH ARE CROSSED AND SOME UNCROSSED, ARE INDICATED BY RED LINES.



¹ Known also as the *conarium* and as the *epiphysis cerebri*. See Appendix, note 365.
² See Appendix, note 477.

³ Or *iter a tertio ad quartum ventriculum*.
⁴ See Appendix, note 372.

FIG. 1228.—NUCLEI OF ORIGIN OF THE COMMON OCULOMOTOR AND TROCHLEAR NERVES IN THE MID-BRAIN OR MESENCEPHALON; THEIR CENTRAL TRACT (BLUE), THEIR INTERCONNECTIONS EACH WITH THE OTHER (RED), AND THEIR CONNEXIONS WITH THE NUCLEUS OF THE SIXTH CRANIAL OR ABDUCENT OCULAR NERVE THROUGH THE POSTERIOR OR DORSAL LONGITUDINAL BUNDLE (RED). THE DIVISION OF THE NUCLEUS OF THE THIRD CRANIAL OR COMMON OCULOMOTOR NERVE INTO THE LATERAL PRINCIPAL NUCLEUS, THE SMALL-CELLED MESIAL NUCLEUS, AND THE LARGE-CELLED MEDIAN OR CENTRAL NUCLEUS (see Appendix, note 407); THE LOCALIZATION OF THE SEVERAL GROUPS OF FIBRES OF THE THIRD NERVE IN THIS NUCLEAR REGION. THE CENTRAL COURSE OF THE SO-CALLED PUPILLARY FIBRES OF THE OPTIC NERVE (REFLEX ARC FOR THE CONTRACTION OF THE PUPIL).

The diagram is based on the researches of Bernheimer.

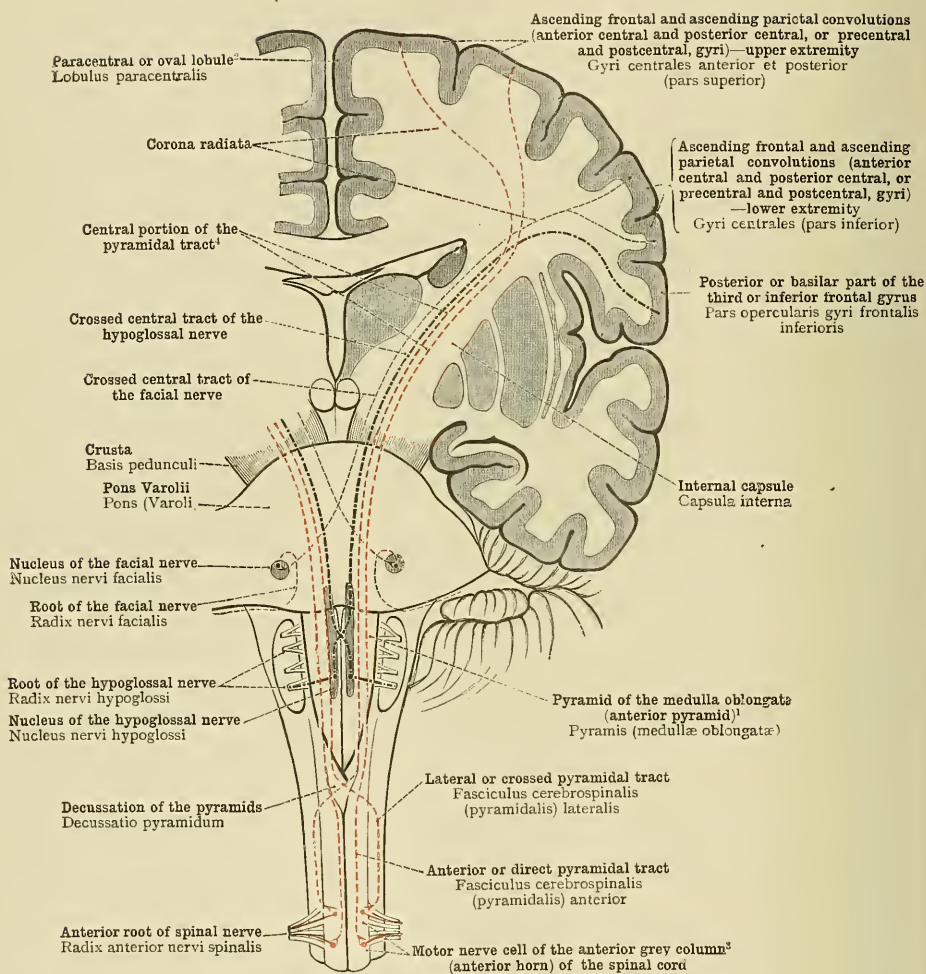


FIG. 1229.—THE PYRAMIDAL TRACT (RED) AND THE ASSOCIATED CENTRAL TRACTS OF THE HYPOGLOSSAL AND FACIAL NERVES. DIAGRAMMATIC.

Decursus fibrarum cerebralium—The course of the fibres of the brain.

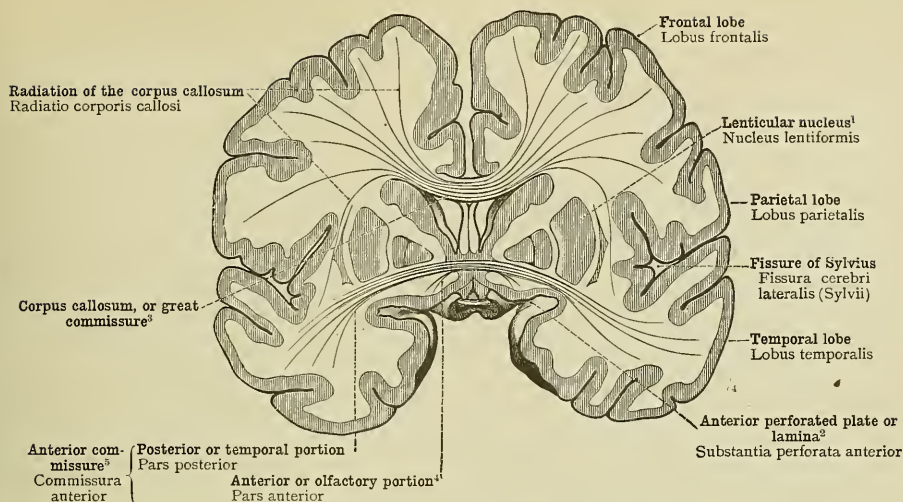


FIG. 1230.—DIAGRAMMATIC REPRESENTATION OF THE TWO PRINCIPAL COMMISSURES OF THE CEREBRUM (see Appendix, note ⁴⁰⁶): THE CORPUS CALLOSUM OR GREAT COMMISSURE WITH ITS RADIATION; AND THE ANTERIOR COMMISSURE, WITH ITS ANTERIOR OR OLFACTORY PORTION, CONNECTED WITH THE FRONTAL LOBE, AND ITS POSTERIOR OR TEMPORAL PORTION, RADIATING INTO THE TEMPORAL LOBE. (See Appendix, note ⁴⁰⁸.)

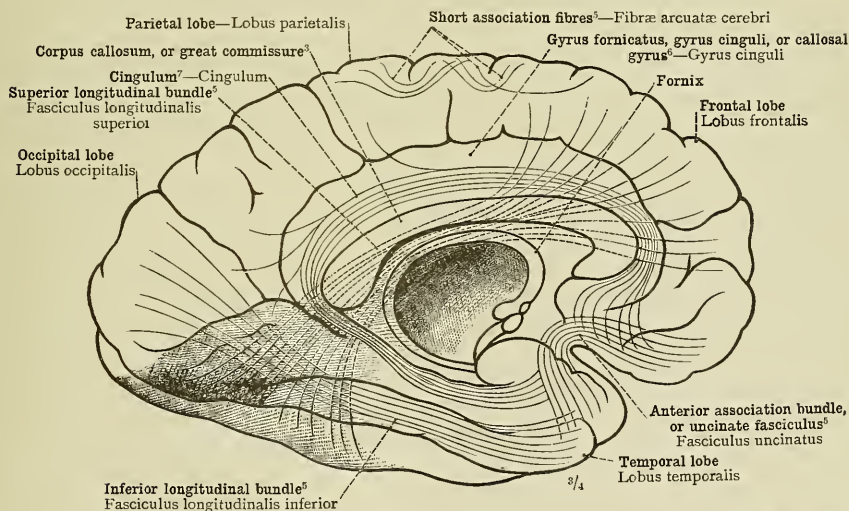


FIG. 1231.—THE PRINCIPAL BUNDLES OF ASSOCIATION FIBRES (see Appendix, note ⁴⁰⁶) OF THE MEDULLARY CENTRE OF THE CEREBRAL HEMISPHERE, SHOWN IN DIAGRAMMATIC PROJECTION ON THE MESIAL SURFACE OF THE HEMISPHERE.

¹ Also known as the *extraventricular portion* (or *nucleus*) of the *corpus striatum*. See note ¹ to p. 766.

² Forming the floor of the *anterior perforated space*.

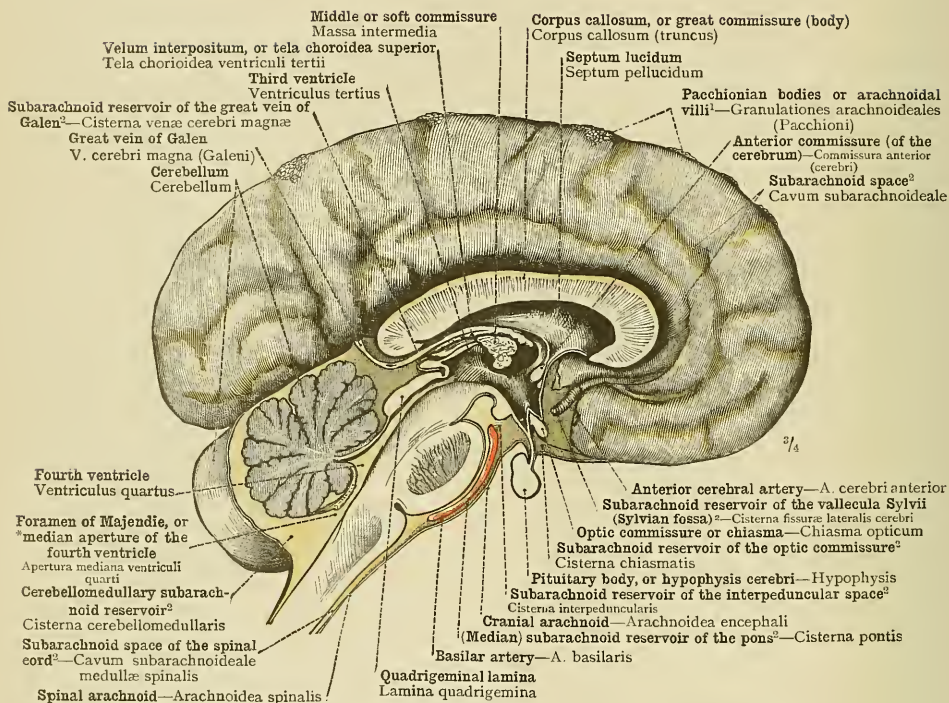
³ Formerly known as the *trabs cerebri*. See Appendix, note ⁴⁰⁶.

⁴ See Appendix, note ⁴⁰⁸.

⁵ See Appendix, note ⁴⁰⁸.

⁶ See Appendix, note ³⁹⁷.

⁷ Also known as the *fillet* of the *corpus callosum* and as the *covered band* of *Reil*. See Appendix, note ⁴⁰⁶.



¹ Known also as *Pacchionian glands* or *Pacchionian granulations*.

² See Appendix, note 479.

FIG. 1232.—THE CRANIAL ARACHNOID, ARACHNOIDEA ENCEPHALI, AND THE SUBARACHNOID SPACE, CAVUM SUBARACHNOIDEALE, WITH ITS VARIOUS SUBDIVISIONS AND RESERVOIRS, AS SEEN IN A MEDIAN SAGITTAL SECTION OF THE BRAIN. THE PACCHIONIAN BODIES OR ARACHNOIDAL VILLI, GRANULATIONES ARACHNOIDEALES (see note ¹ above).

The subarachnoid space has been filled with coloured gelatine, and appears in some places somewhat more distended than in the normal condition.

Meninges encephali—The membranes of the brain.

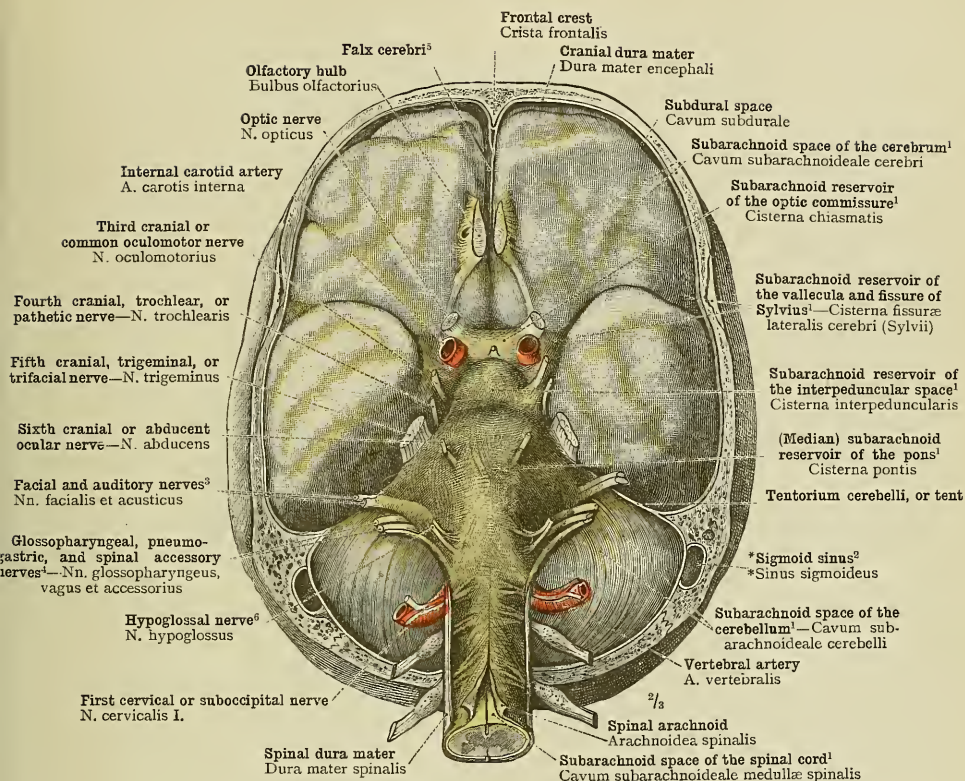


FIG. 1233.—THE CRANIAL ARACHNOID, ARACHNOIDEA ENCEPHALI; FORM AND EXTENT OF THE SUBARACHNOID SPACE, CAVUM SUBARACHNOIDEALE (WHICH HAS BEEN INJECTED WITH GELATINE), ON THE BASAL ASPECT OF THE BRAIN, AND, MORE ESPECIALLY, THE RELATIONS OF THIS SPACE TO THE ROOTS OF THE CRANIAL NERVES.

The gelatine was injected before the head was opened, and the head was then hardened entire in formalin solution. Subsequently the base of the skull and the cervical vertebræ were carefully removed with saw and chisel and the dura mater was dissected off. In the region of the spinal cord the arachnoid was divided for a short distance by a median incision, and the subarachnoid space of the spinal cord was thus opened. Between the arachnoid and the dura mater where that membrane has been preserved in apposition with the calvaria, the subdural space of the brain is visible.

¹ See Appendix, note 459.

² See Appendix, note 440.

³ The *facial nerve* is the *seventh cranial nerve* in Soemmerring's enumeration; the *porta mollis* of the *seventh* in that of Willis. The *auditory nerve* is the *eighth cranial nerve* in Soemmerring's enumeration; the *porta mollis* of the *seventh* in that of Willis.

⁴ The *glossopharyngeal* is the *ninth*, the *pneumogastric* or *vagus* the *tenth*, and the *spinal accessory* the *eleventh cranial nerve* in Soemmerring's enumeration; they are respectively the *first*, *second*, and *third trunks* of the *eighth cranial nerve* in that of Willis.

⁵ Sometimes called the *falx major*.

⁶ *Twelfth cranial nerve* in Soemmerring's enumeration, *ninth* in that of Willis; known also as the *lingual motor nerve*.

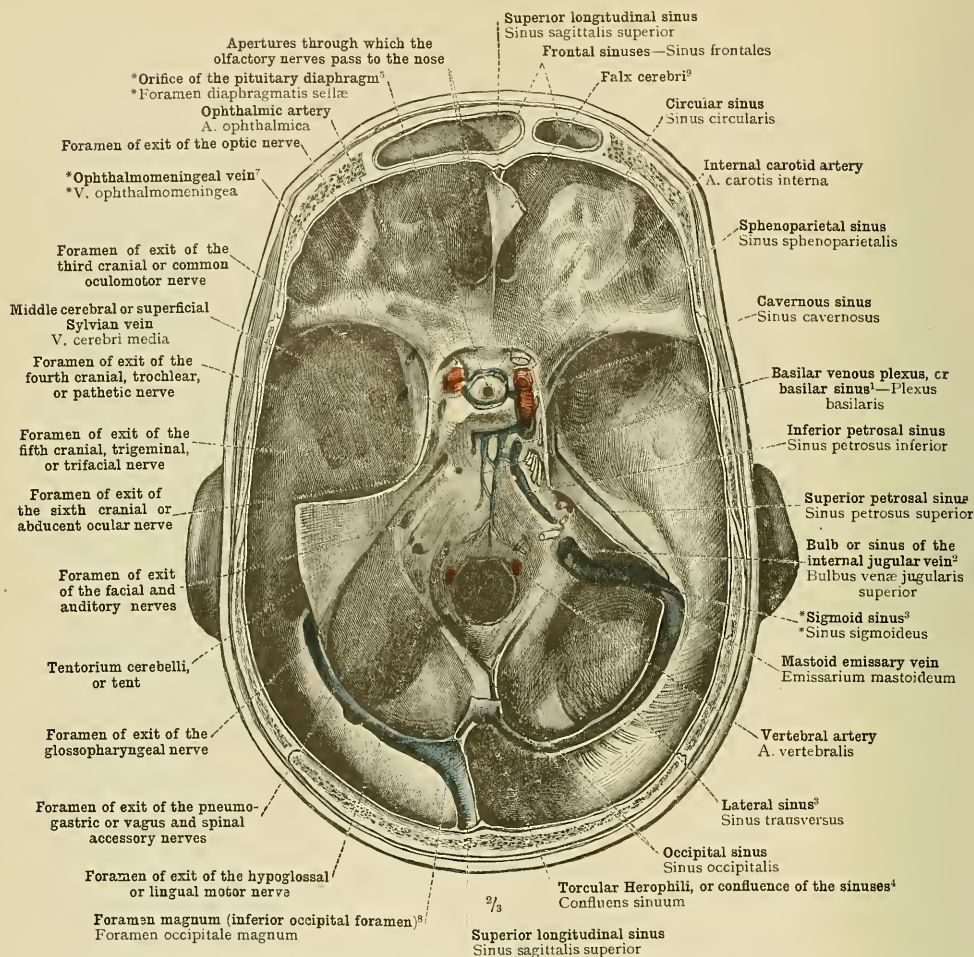


FIG. 1234.—THE CRANIAL DURA MATER, DURA MATER ENCEPHALI, WITH THE SINUSES OF THE DURA MATER (VENOUS SINUSES OF THE CRANIUM, MENINGEAL SINUSES), SINUS DURÆ MATRIS, ON THE INTERNAL SURFACE OF THE BASE OF THE SKULL. ON THE LEFT SIDE THE FORAMINA OF EXIT⁶ OF THE CRANIAL NERVES THROUGH THE DURA MATER ARE DISPLAYED; ON THE RIGHT SIDE THE ROOTS OF THESE NERVES ARE DISPLAYED AS THEY ARE ABOUT TO PERFORATE THE DURA MATER.

The tentorium cerebelli, or tent, has for the most part been removed; only on the left side has a small portion of this structure been preserved, and this remnant has been turned forwards along its line of attachment to the superior border (or angle) of the petrous portion of the temporal bone. Most of the sinuses have been opened.

¹ Sometimes known as the *transverse sinus*. The *basilar venous plexus* must be carefully distinguished from the *basilar* or *basal vein*, *vena basalis Rosenthalii* (shown in Fig. 1202, p. 784). See Appendix to Part V., notes 226 and 227.

² See Appendix to Part V., note 121.

³ See Appendix, note 410.

⁴ See Appendix to Part V., note 266.

⁵ See Appendix, note 411.

⁶ *Foramina of Exit*.—The term *foramen of exit* is employed as the most suitable English equivalent of the German *Austrittsöffnung* or *Durchtrittsöffnung*. The words "*through the dura mater*" are to be understood when not expressed.

⁷ *Ophthalmomeningeal V. vein*.—The vein thus named by the author is a communicating branch between the *superior ophthalmic vein* and the *middle cerebral or superficial Sylvian vein*.

⁸ See Appendix, note 412.

⁹ Sometimes called the *falx major*.

Meninges encephali—The membranes of the brain.

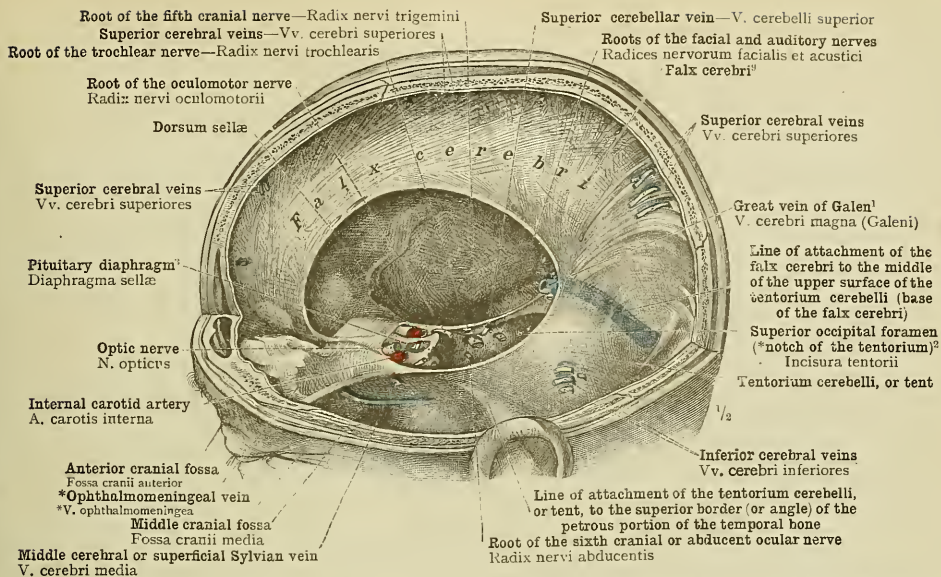


FIG. 1235.—THE FALX CEREBRI AND THE TENTORIUM CEREBELLI, OR TENT, SEEN FROM THE LEFT SIDE. THE TRUNKS OF THE CEREBRAL VEINS THAT OPEN INTO THE VENOUS SINUSES OF THE CRANIUM.

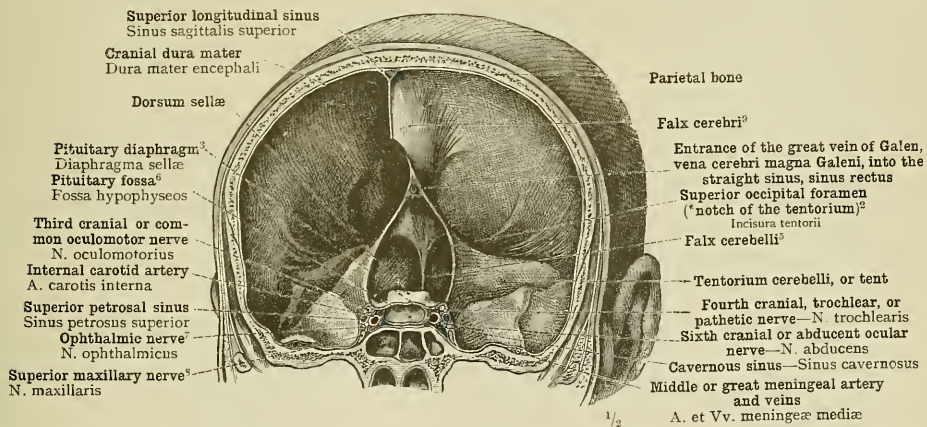


FIG. 1236.—THE TENTORIUM CEREBELLI, OR TENT, THE POSTERIOR PORTION OF THE FALX CEREBRI (FALX MAJOR), AND THE FALX CEREBRI (FALX MINOR), AS SEEN FROM BEFORE IN A CORONAL SECTION OF THE HEAD. THE SECTION PASSES THROUGH THE PITUITARY FOSSA (see note ² to p. 60, in Part I.) AND THE CAVERNOUS SINUSES IMMEDIATELY BEHIND THE PITUITARY BODY OR HYPOPHYSIS CEREBRI; IN ADDITION, THEREFORE, TO THE STRUCTURES JUST MENTIONED, THE FOLLOWING ARE ALSO DISPLAYED: WITHIN THE CAVITY OF THE CAVERNOUS SINUS, THE INTERNAL CAROTID ARTERY AND THE SIXTH CRANIAL OR ABDUCENT OCULAR NERVE; AND IN THE OUTER WALL OF THE CAVERNOUS SINUS, THE THIRD CRANIAL OR COMMON OCULOMOTOR NERVE, THE FOURTH CRANIAL, PATHETIC, OR TROCHLEAR NERVE, THE OPHTHALMIC NERVE (FIRST DIVISION OF THE FIFTH), AND THE SUPERIOR MAXILLARY NERVE (SECOND DIVISION OF THE FIFTH CRANIAL NERVE).

¹ Continued posteriorly into the straight sinus, which is visible in Fig. 1235 through the dura mater along the base of the falx cerebri.

² See Appendix, note 412.

³ By Quain called the operculum or tentorium of the hypophysis.

⁴ See Appendix, note 413.

⁵ See note 7 to p. 804.

⁶ Sometimes called the falx minor.

⁷ See note 2 to p. 60, in Part I.

⁸ Or first division of the fifth cranial, trigeminal, or trifacial nerve.

⁹ Sometimes called the falx major.

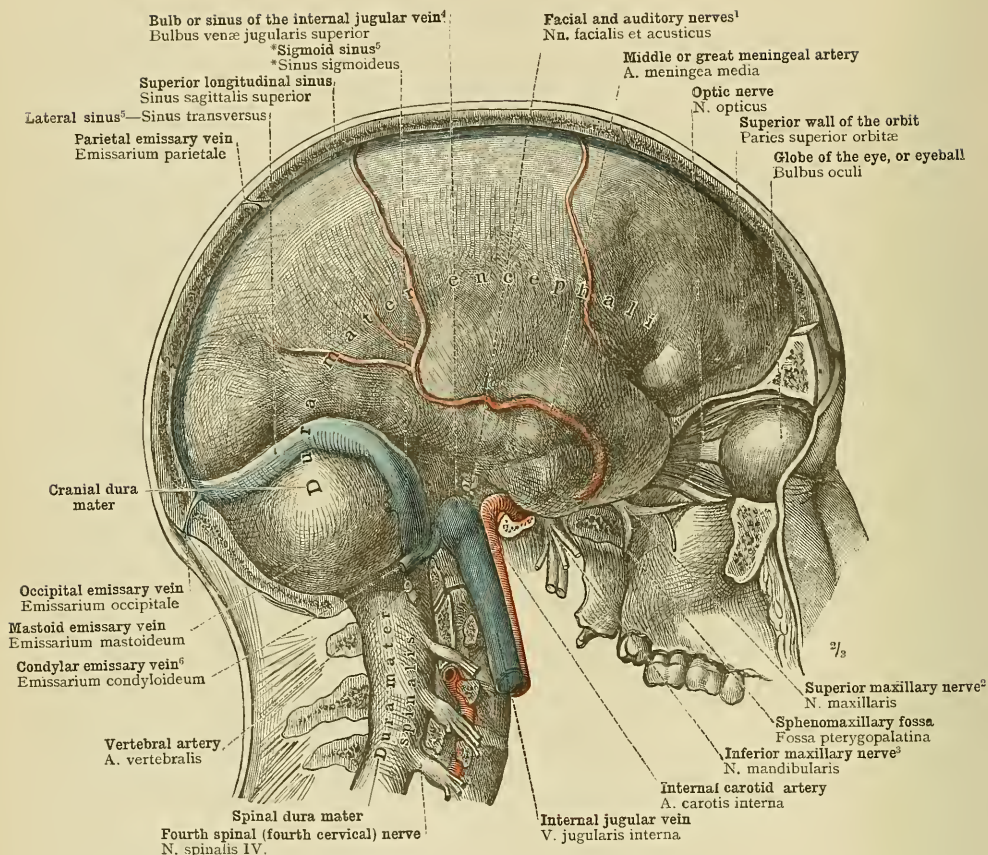


FIG. 1237.—THE CRANIAL DURA MATER, DURA MATER ENCEPHALI, DISPLAYED FROM THE SIDE IN CONTINUITY WITH THE SPINAL DURA MATER, DURA MATER SPINALIS, BY THE REMOVAL OF THE RIGHT HALF OF THE SKULL AND OF THE UPPER CERVICAL VERTEBRÆ. THE SINUSES OF THE DURA MATER (VENOUS SINUSES OF THE CRANIUM, MENINGEAL SINUSES), SINUS DURÆ MATRIS, AND ALSO THE EMISSARY VEINS (EMISSARIA SANTORINI) THAT CONNECT THESE SINUSES WITH THE VEINS OF THE EXTERIOR OF THE SKULL, WERE INJECTED WITH RESIN BY WAY OF THE INTERNAL JUGULAR VEIN.

¹ The facial nerve is the seventh cranial nerve in Soemmerring's enumeration, the *portio dura* of the seventh in that of Willis; the auditory nerve is the eighth cranial nerve in Soemmerring's enumeration, the *portio mollis* of the seventh in that of Willis.

² Or second division of the fifth cranial, trigeminal, or trifacial nerve.

³ Or third division of the fifth cranial, trigeminal, or trifacial nerve.

⁴ See Appendix to Part V., note 121.

⁵ See Appendix, note 410.

⁶ See Appendix to Part V., note 265.

Meninges encephali—The membranes of the brain.

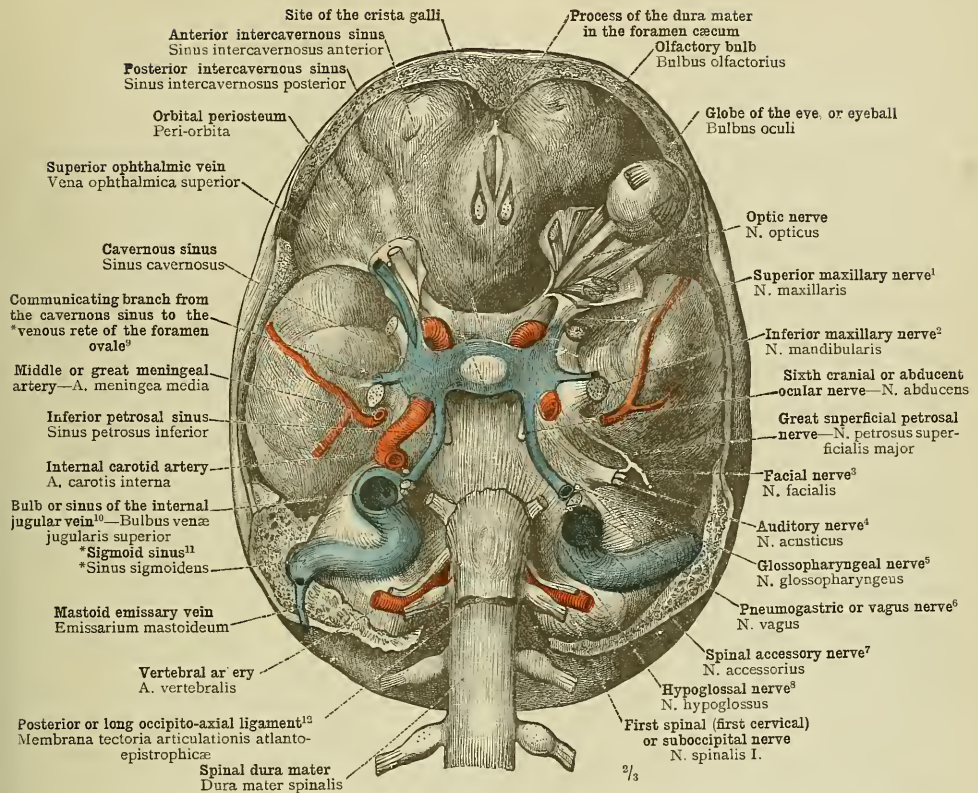


FIG. 1238.—THE CRANIAL DURA MATER, DURA MATER ENCEPHALI, DISPLAYED FROM BELOW IN CONTINUITY WITH THE SPINAL DURA MATER, DURA MATER SPINALIS, BY THE REMOVAL OF THE BASE OF THE SKULL AND THE UPPER CERVICAL VERTEBRÆ. THE TUBULAR PROLONGATIONS OF THE DURA MATER WHICH PASS ALONG THE CRANIAL AND SPINAL NERVES AS THEY LEAVE THE CEREBROSPINAL CAVITY ARE VISIBLE.

The basal sinuses of the dura mater (venous sinuses of the cranium, meningeal sinuses), sinus duræ matris, have been distended with blue resin, the arteries with red resin. On the left side of the body, the glossopharyngeal, pneumogastric or vagus, and spinal accessory nerves, and also the bulb or sinus of the internal jugular vein (see Appendix to Part V., note ¹²¹) and the lowest part of the inferior petrosal sinus, have been drawn apart one from another in the region of the jugular foramen, in order that their mutual relations may be more clearly manifest.

¹ Or second division of the fifth cranial, trigeminal, or trifacial nerve.

² Or third division of the fifth cranial, trigeminal, or trifacial nerve.

³ Seventh cranial nerve in Soemmerring's enumeration; *portio dura of the seventh* in that of Willis.

⁴ Eighth cranial nerve in Soemmerring's enumeration; *portio mollis of the seventh* in that of Willis.

⁵ Ninth cranial nerve in Soemmerring's enumeration; *first trunk of the eighth* in that of Willis.

⁶ Tenth cranial nerve in Soemmerring's enumeration; *second trunk of the eighth* in that of Willis.

⁷ Eleventh cranial nerve in Soemmerring's enumeration; *third trunk of the eighth* in that of Willis.

⁸ Twelfth cranial nerve in Soemmerring's enumeration, *ninth* in that of Willis; also called the *lingual motor nerve*.

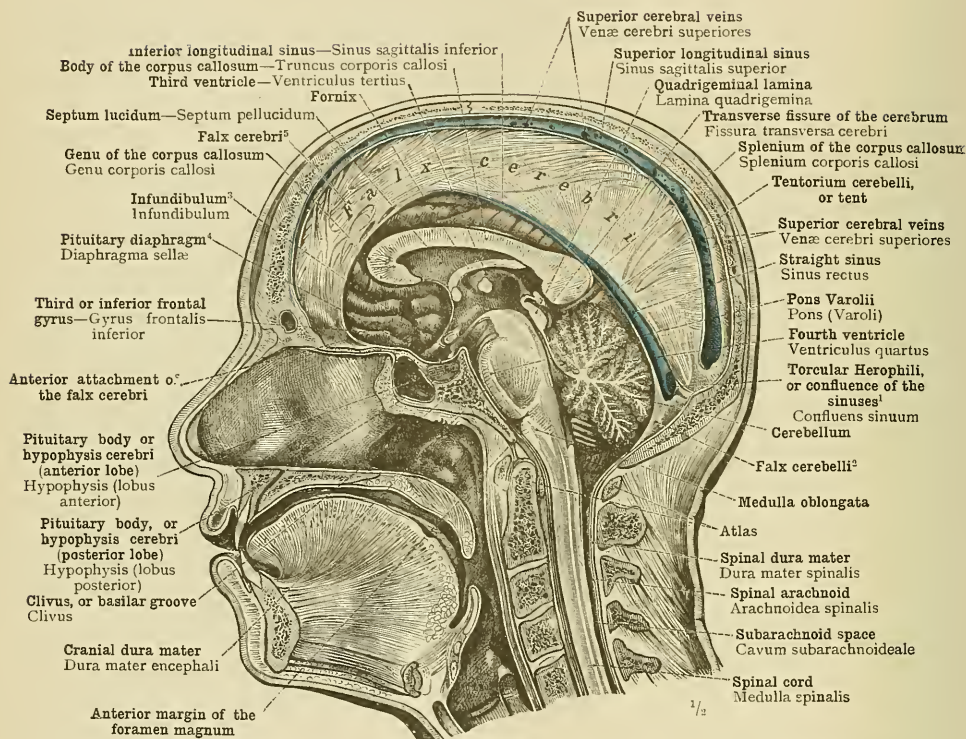
⁹ See Appendix to Part V., note ²².

¹⁰ See Appendix to Part V., note ¹²¹.

¹¹ See Appendix, note ⁴¹⁰.

¹² Macalister calls this ligament *ligamentum latum axiale*, the broad axial ligament.

Meninges encephali—The membranes of the brain.



¹ See Appendix to Part V., note 36.

² Sometimes called *falx minor*.

³ By Quain called the *operculum* or *tentorium* of the *hypophysis*. See Appendix, note 41.

⁴ See Appendix, note 36.

⁵ Sometimes called the *falx major*.

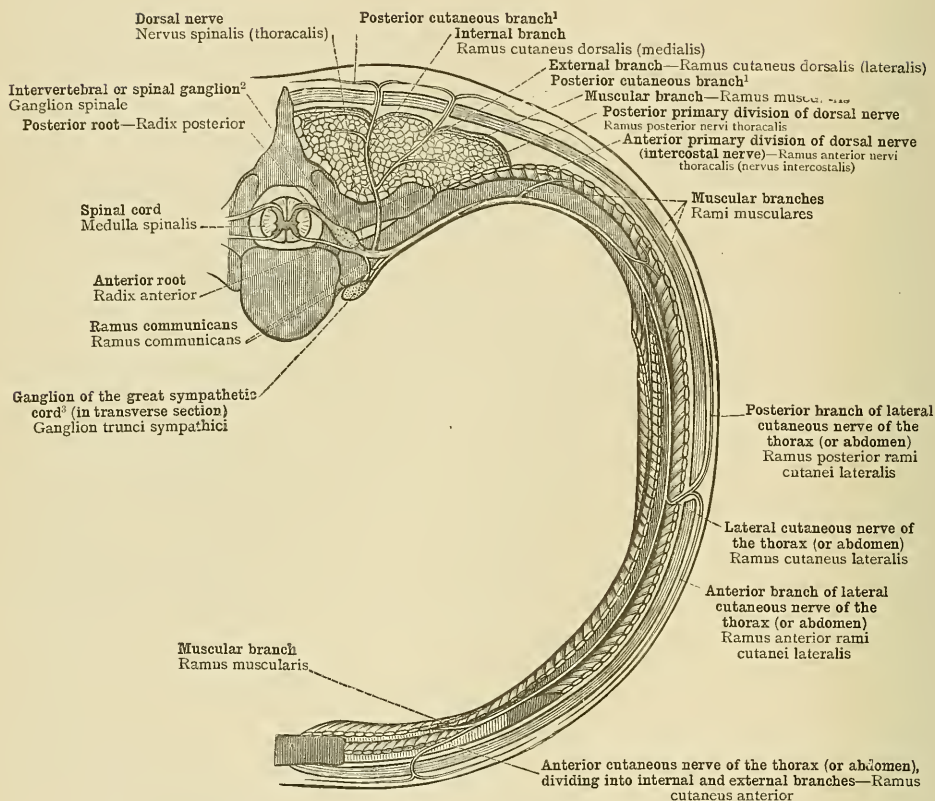
FIG. 1239.—SAGITTAL SECTION THROUGH THE HEAD, TO THE LEFT OF, BUT CLOSE TO, THE MEDIAN PLANE. RELATIONS OF THE FALX CEREBRI TO THE CORPUS CALLOSUM OR GREAT COMMISSURE AND TO THE INNER OR MESIAL SURFACE OF THE CEREBRAL HEMI-SPHERES. THE MUTUAL RELATIONS OF THE PONS VAROLII, THE MEDULLA OBLONGATA, THE CEREBELLUM, AND THE THIRD AND FOURTH VENTRICLES; AND, FURTHER, THE RELATION OF THE VARIOUS PARTS JUST ENUMERATED TO THE ROOF OF THE SKULL IN THE MEDIAN PLANE.

Meninges encephali—The membranes of the brain.

SYSTEMA NERVORUM
PERIPHERICUM
THE
PERIPHERAL NERVOUS SYSTEM

NERVI SPINALES

SPINAL NERVES



¹ See Appendix, note 413.

² Also called the ganglion of the posterior root.

³ Called by Gaskell *vertebral* or *lateral ganglion* (of the sympathetic).

⁴ See Appendix, note 414.

FIG. 1240.—DIAGRAMMATIC REPRESENTATION OF THE DISTRIBUTION OF A DORSAL NERVE, NERVUS THORACALIS, IN A SEGMENT OF THE TRUNK. ANTERIOR PRIMARY DIVISION, RAMUS ANTERIOR (OR INTERCOSTAL NERVE—see Appendix, note ⁴¹⁴—NERVUS INTERCOSTALIS), AND POSTERIOR PRIMARY DIVISION, RAMUS POSTERIOR. CONNEXION OF THE ANTERIOR PRIMARY DIVISION WITH THE GREAT GANGLIATED CORD OF THE SYMPATHETIC SYSTEM BY MEANS OF THE RAMUS COMMUNICANS.

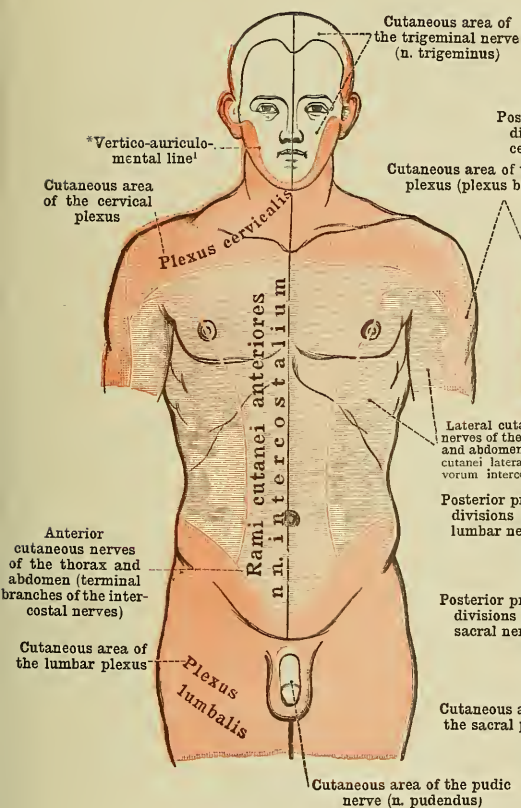


FIG. 1241.—THE CUTANEOUS AREAS OF THE NERVES OF THE TRUNK ON THE ANTERIOR SURFACE OF THE BODY.

The cutaneous areas of the anterior primary divisions of the spinal nerves are tinted red; the cutaneous areas of the posterior primary divisions are tinted blue.

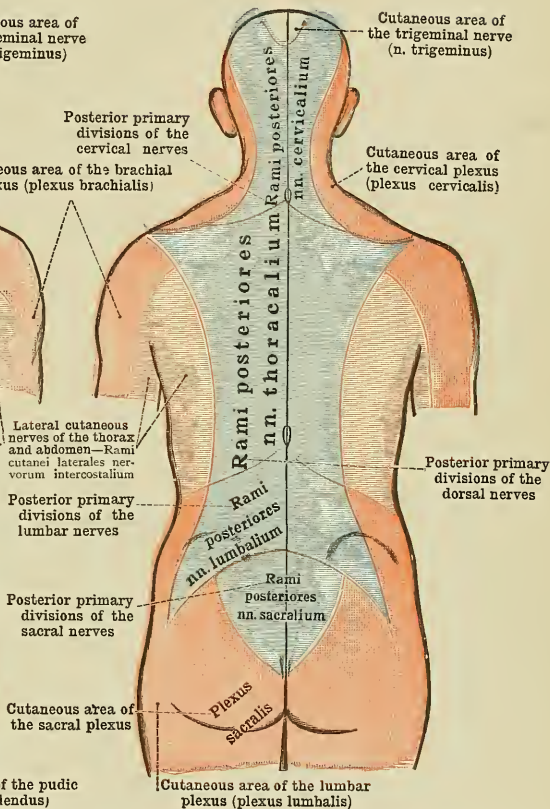


FIG. 1242.—THE CUTANEOUS AREAS OF THE NERVES OF THE TRUNK ON THE POSTERIOR SURFACE OF THE BODY.

¹ **Vertico-auriculo-mental Line.*—"The area of distribution of the spinal nerves . . . embraces . . . the whole of the skin, with the exception of the skin of the face, the forehead, and the vertex; the upper boundary of this area being a line which extends from the vertex over the aricle through the external auditory meatus, thence curves with a forward convexity over the parotidomasseteric region, and descends obliquely to the chin" (Von Langer and Toldt, *op. cit.*, p. 576). "The cutaneous area of the trigeminal nerve is bounded by the above-described vertico-auriculomental line (Scheitel-Ohr-Kinnlinie), which is the upper limit of the cutaneous area of the spinal nerves" (*ibid.*, pp. 696, 697).

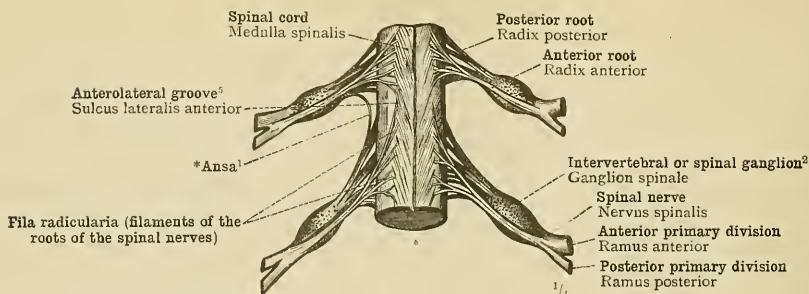


FIG. 1243.—THE UNION OF THE ANTERIOR AND POSTERIOR ROOTS OF THE SPINAL NERVES TO FORM THE MIXED TRUNKS OF THE SPINAL NERVES, NERVI SPINALES. THE INTERVERTEBRAL OR SPINAL GANGLIA (OR GANGLIA OF THE POSTERIOR ROOTS), GANGLIA SPINALIA.

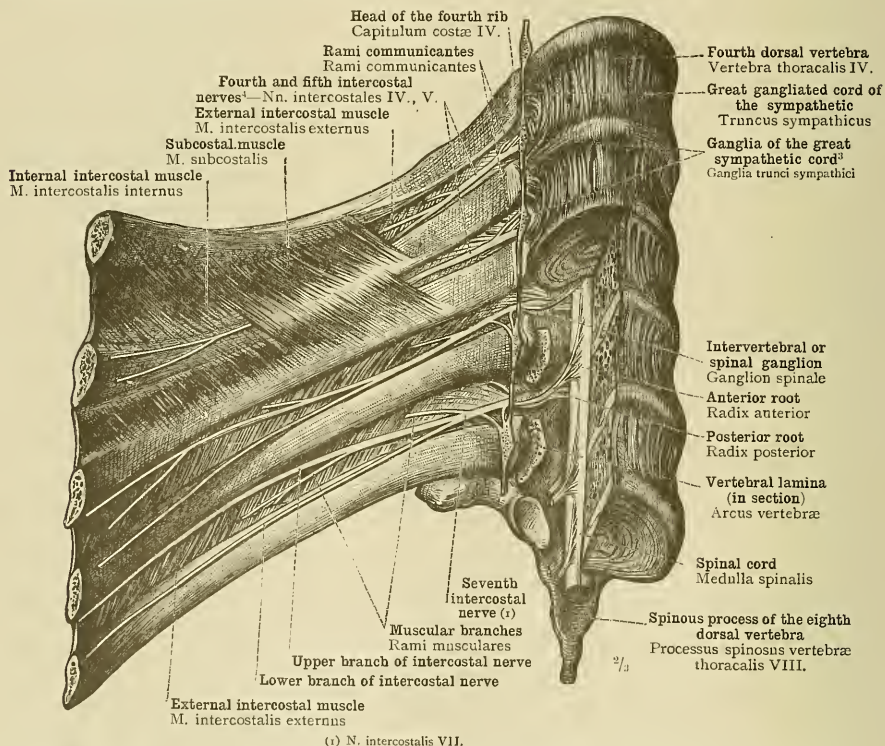


FIG. 1244.—COURSE AND RAMIFICATION OF THE ANTERIOR PRIMARY DIVISIONS OF THE DORSAL NERVES, NERVI THORACALES, CONSTITUTING THE INTERCOSTAL NERVES, NERVI INTERCOSTALES, AND THEIR CONNEXION WITH THE GREAT GANGLIATED CORD OF THE SYMPATHETIC, TRUNCUS SYMPATHICUS, AS SEEN FROM THE INTERIOR OF THE TRUNK.

In the sixth, seventh, and eighth dorsal vertebrae, the right half of the vertebral body has been cut away; and in the sixth and seventh intercostal spaces the internal intercostal muscle has been removed.

¹ See Appendix, note 415.

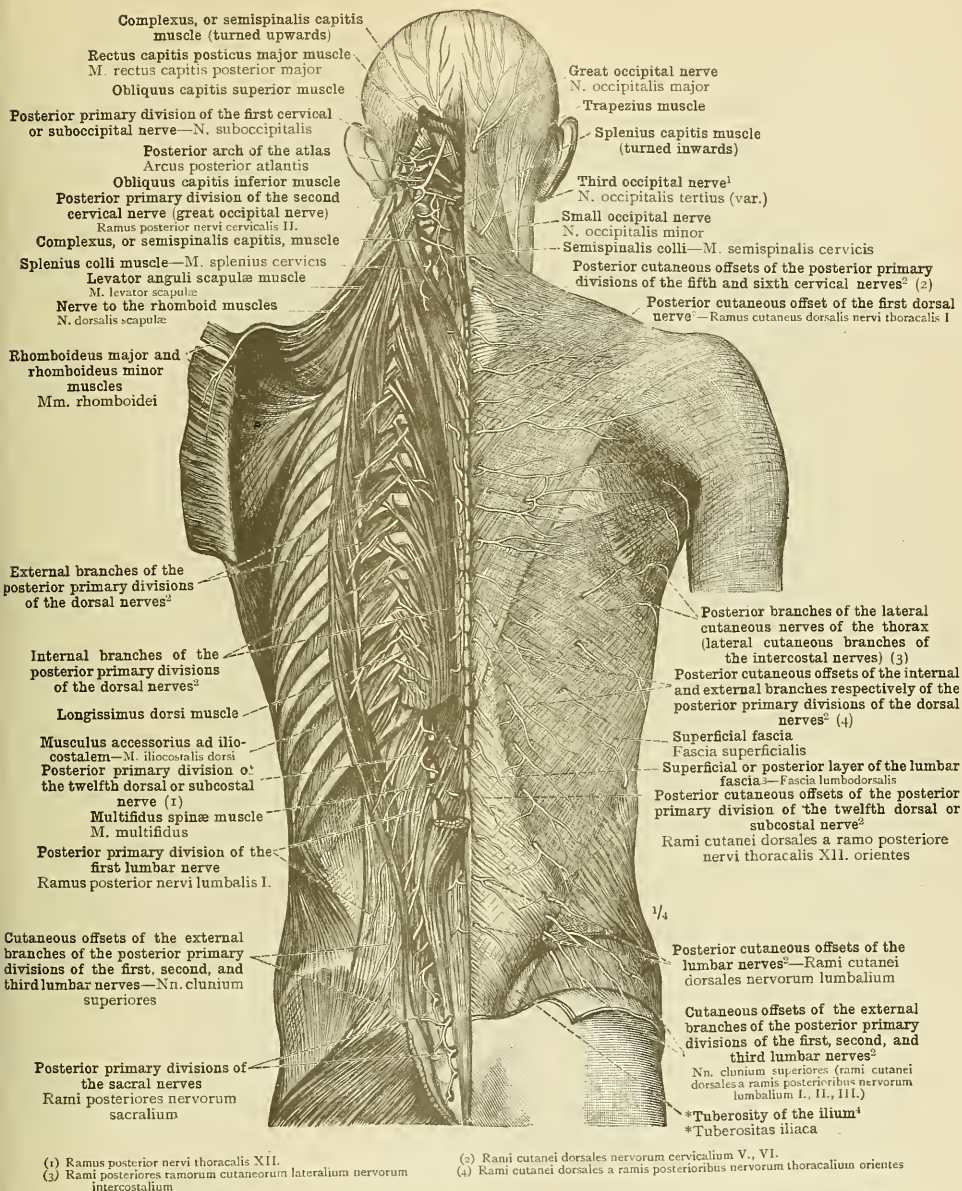
² Also called the ganglion of the posterior root.

³ Called by Gaskell vertebral or lateral ganglion (of the sympathetic).

⁴ See Appendix, note 414.

⁵ See Appendix, note 315.

Nerves of the Trunk.—Nervi intercostales—The intercostal nerves (see Appendix, note 414).



(1) Ramus posterior nervi thoracalis XII.

(2) Rami posteriores tamorum cutaneorum lateraliu nervorum intercostalium

(3) Rami cutanei dorsales nervorum cervicalium V., VI.

(4) Rami cutanei dorsales a ramis posterioribus nervorum thoracalium orientes

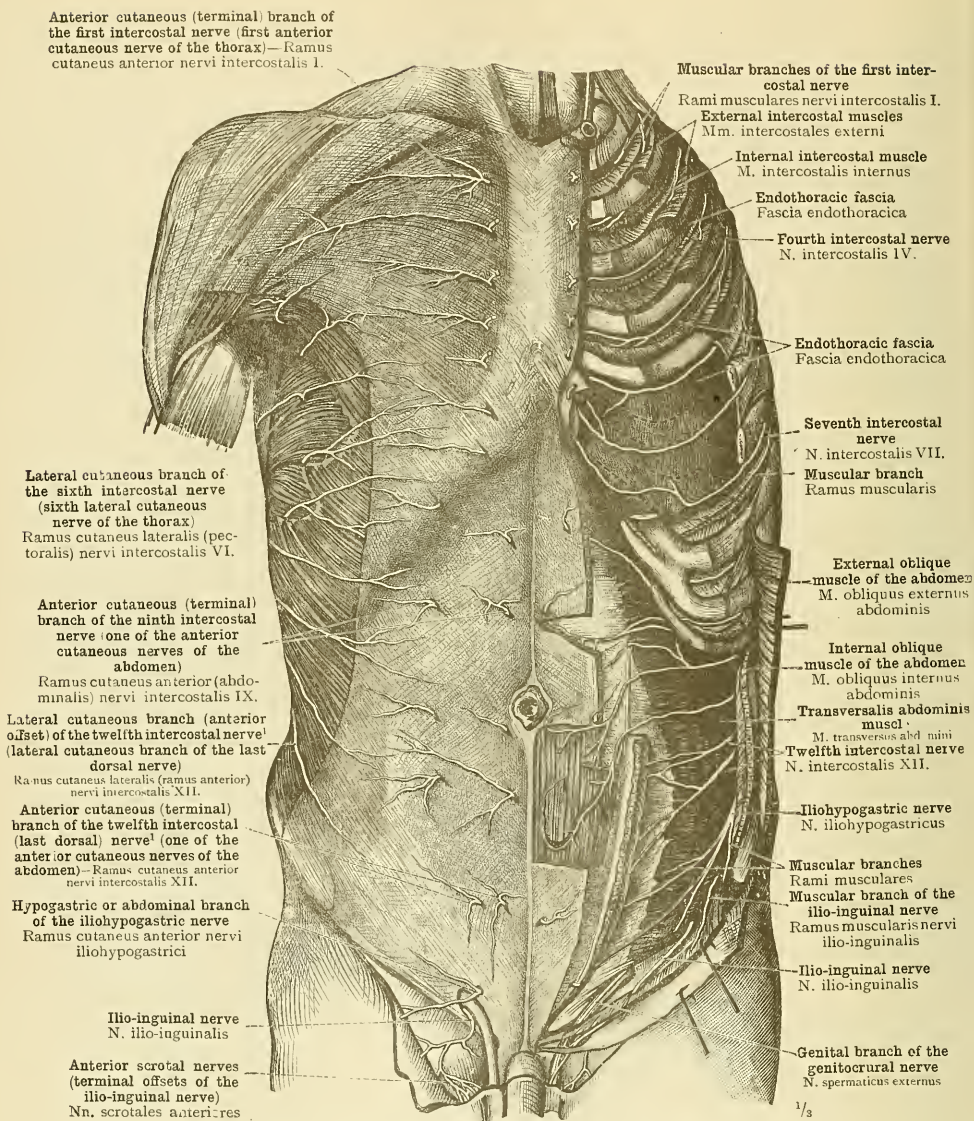
FIG. 1245.—THE DISTRIBUTION OF THE POSTERIOR PRIMARY DIVISIONS, THE RAMI POSTERIORES, OF THE SPINAL NERVES, Nervi Spinales. ON THE RIGHT SIDE OF THE BODY THE CUTANEOUS OFFSETS. ON THE LEFT SIDE THE MUSCULAR OFFSETS, ARE SHOWN; AND ON THE LEFT SIDE ALSO, IN PART, THE COURSE OF THE TRUNKS OF THE POSTERIOR PRIMARY DIVISIONS.

1 See Appendix, note 416.

2 See Appendix, note 413.

3 For an account of the nomenclature of the different portions of the lumbar fascia, see footnotes to pp. 267 and 285, in Part III.

4 See footnote to p. 128, in Part I.

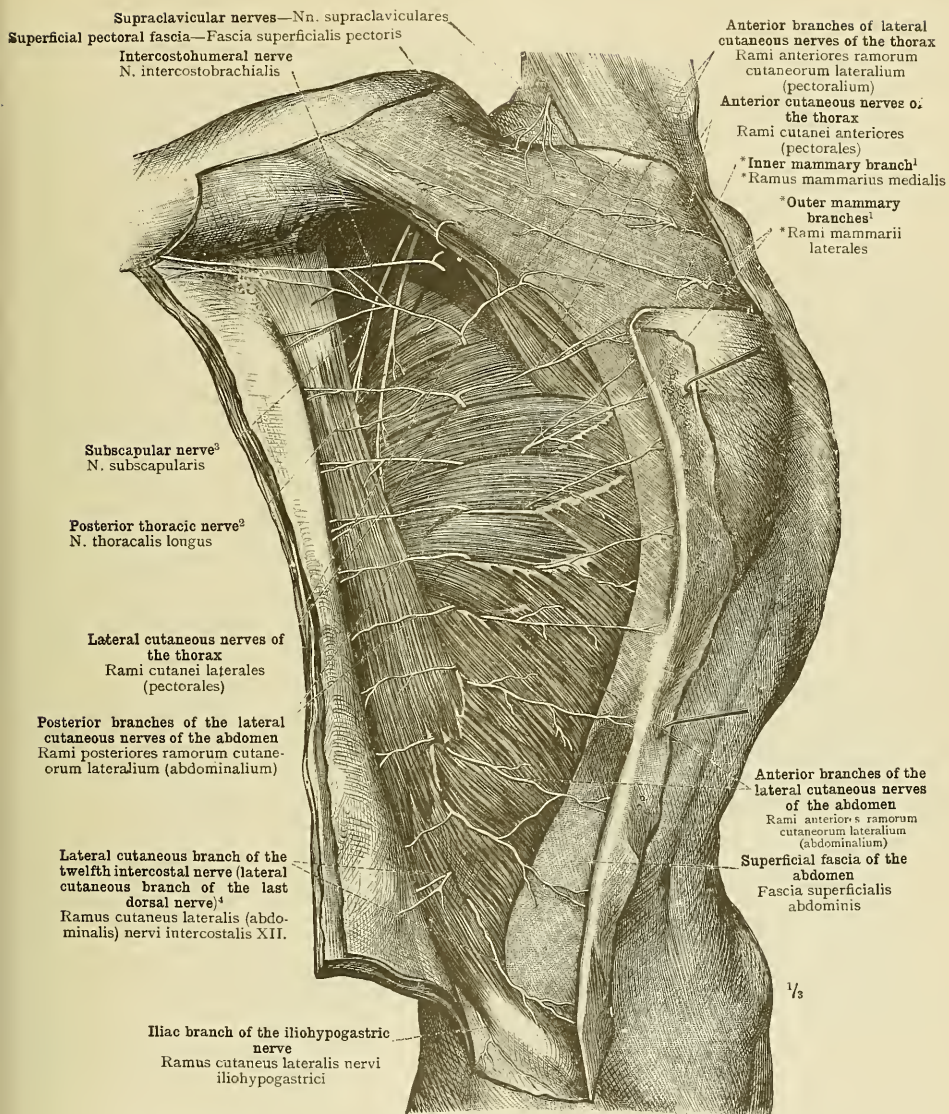


¹ The twelfth intercostal nerve is sometimes distinguished as the subcostal nerve.

FIG. 1246.—THE CUTANEOUS NERVES OF THE ANTERIOR SURFACE OF THE TRUNK.

In order to demonstrate the course of the intercostal nerves, the sixth and seventh ribs and the cartilage of the eighth rib were on the left side partially removed; the situation of the removed segments is, however, indicated by dotted lines. The external and internal intercostal muscles, and also the external and internal oblique muscles of the abdomen and the rectus abdominis muscle, were partially removed.

Nerves of the Trunk.—Rami anteriores nervorum intercostalium—Anterior cutaneous nerves of the thorax and abdomen.



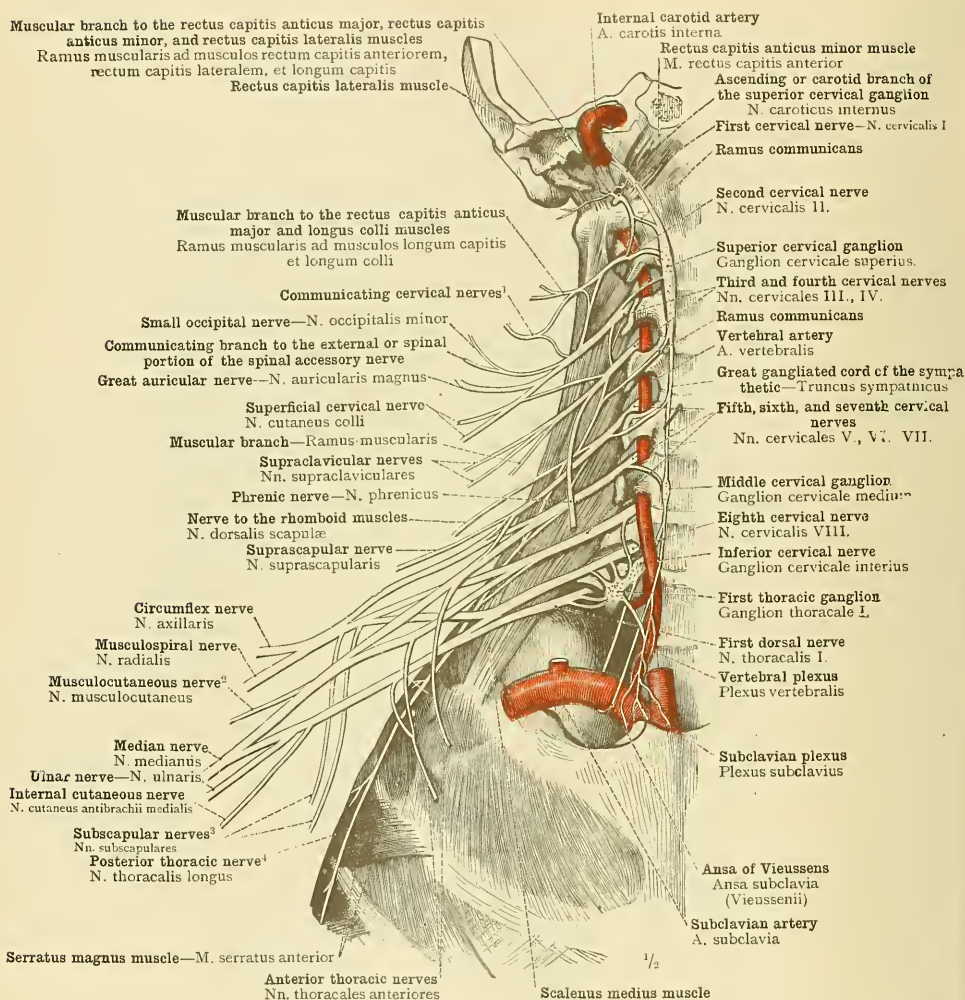
¹ See Appendix, note 437.
 ² See Appendix, note 419.

³ Formerly known as the *external respiratory nerve* of Bell.

⁴ The *twelfth intercostal nerve* is sometimes distinguished as the *subcostal nerve*.

FIG. 1247.—THE CUTANEOUS NERVES OF THE RIGHT SIDE OF THE TRUNK; THE LATERAL CUTANEOUS NERVES OF THE THORAX AND ABDOMEN (LATERAL CUTANEOUS BRANCHES OF THE INTERCOSTAL NERVES, RAMI CUTANEI LATERALES NERVORUM INTERCOSTALIUM). INTERCOSTOHUMERAL NERVES, A HUMERAL OFFSET ARISING IN THIS SPECIMEN FROM THE LATERAL CUTANEOUS OFFSET, NOT ONLY OF THE SECOND, BUT ALSO OF THE THIRD INTERCOSTAL NERVE.

Nerves of the Trunk.—Rami cutanei laterales nervorum intercostalium—Lateral cutaneous nerves of the thorax and abdomen.



¹ See Appendix, note 419.
³ See Appendix note 418.

² Sometimes called the *external cutaneous nerve*.
⁴ Formerly known as the *external respiratory nerve* of Bell.

FIG. 1248.—FORMATION OF THE CERVICAL PLEXUS FROM THE ANTERIOR PRIMARY DIVISIONS OF THE FOUR UPPER CERVICAL NERVES, AND THE FORMATION OF THE BRACHIAL PLEXUS FROM THE ANTERIOR PRIMARY DIVISIONS OF THE FOUR LOWER CERVICAL NERVES AND THE FIRST DORSAL NERVE. THE NAMED NERVES ARISING FROM THE CERVICAL PLEXUS AND THE BRACHIAL PLEXUS. THE COMMUNICATIONS BETWEEN THE CERVICAL NERVES AND THE GANGLIA OF THE GREAT SYMPATHETIC CORD.

Plexus cervicalis—Cervical plexus.—Plexus brachialis—Brachial plexus.

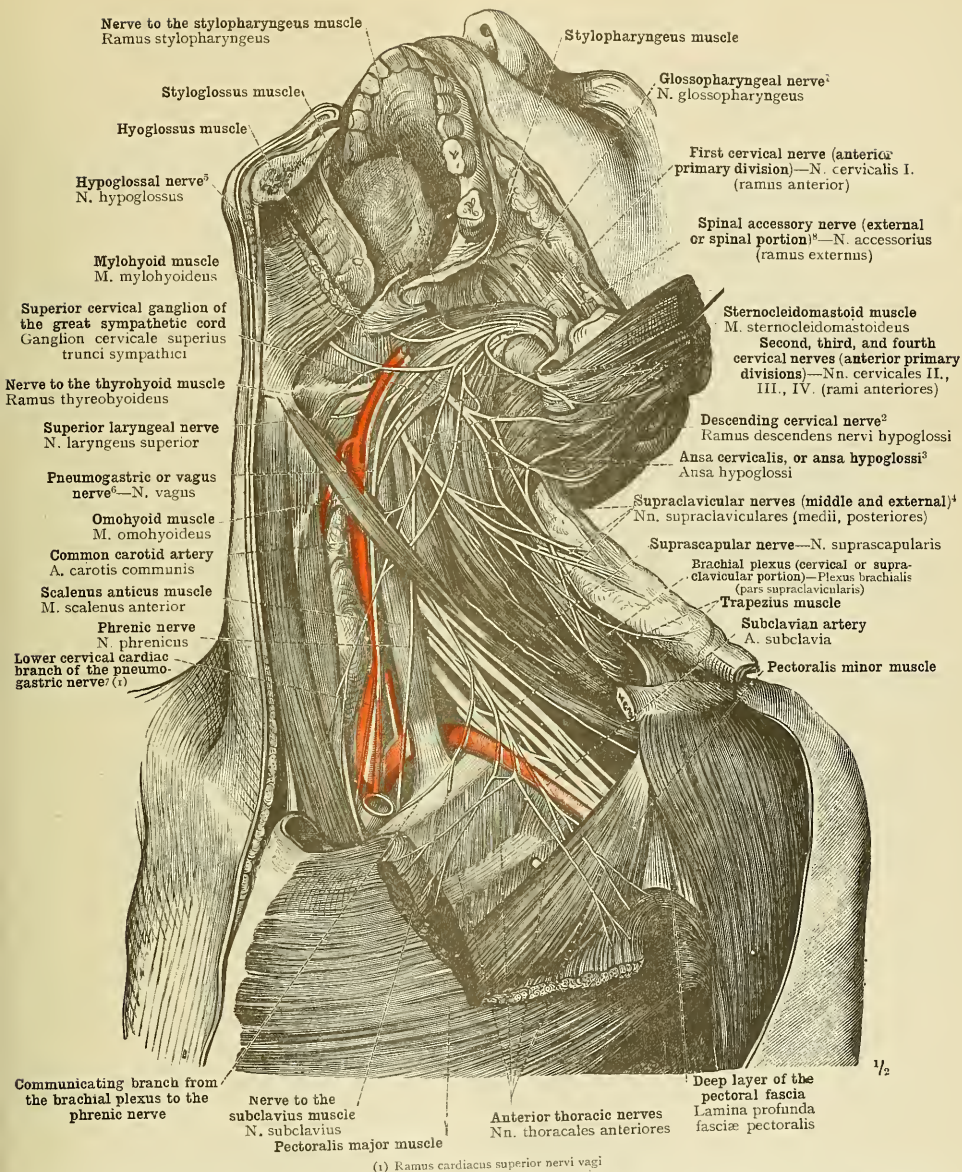


FIG. 1249.—THE DEEP NERVES OF THE NECK, DISPLAYED BY THE REMOVAL OF THE STERNOCLEIDOMASTOID MUSCLE. BY THE PARTIAL REMOVAL OF THE CLAVICLE THE BRACHIAL PLEXUS HAS ALSO BEEN EXPOSED.

¹ Ninth cranial nerve in Soemmerring's enumeration; first trunk of the eighth cranial nerve in that of Willis.

² See Appendix, note 427. ³ See Appendix, note 427.

⁴ Supraclavicular Nerves.—These are arranged in three groups: internal or subscapular; middle or supraclavicular (proper); and external or supra-acromial, also called posterior-branches.

⁵ Twelfth cranial nerve in Soemmerring's enumeration; ninth in that of Willis; also known as the lingual motor nerve.

⁶ Tenth cranial nerve in Soemmerring's enumeration; second trunk of the eighth cranial nerve in that of Willis.

⁷ See Appendix, note 427.

⁸ Eleventh cranial nerve in Soemmerring's enumeration; third trunk of the eighth cranial nerve in that of Willis.

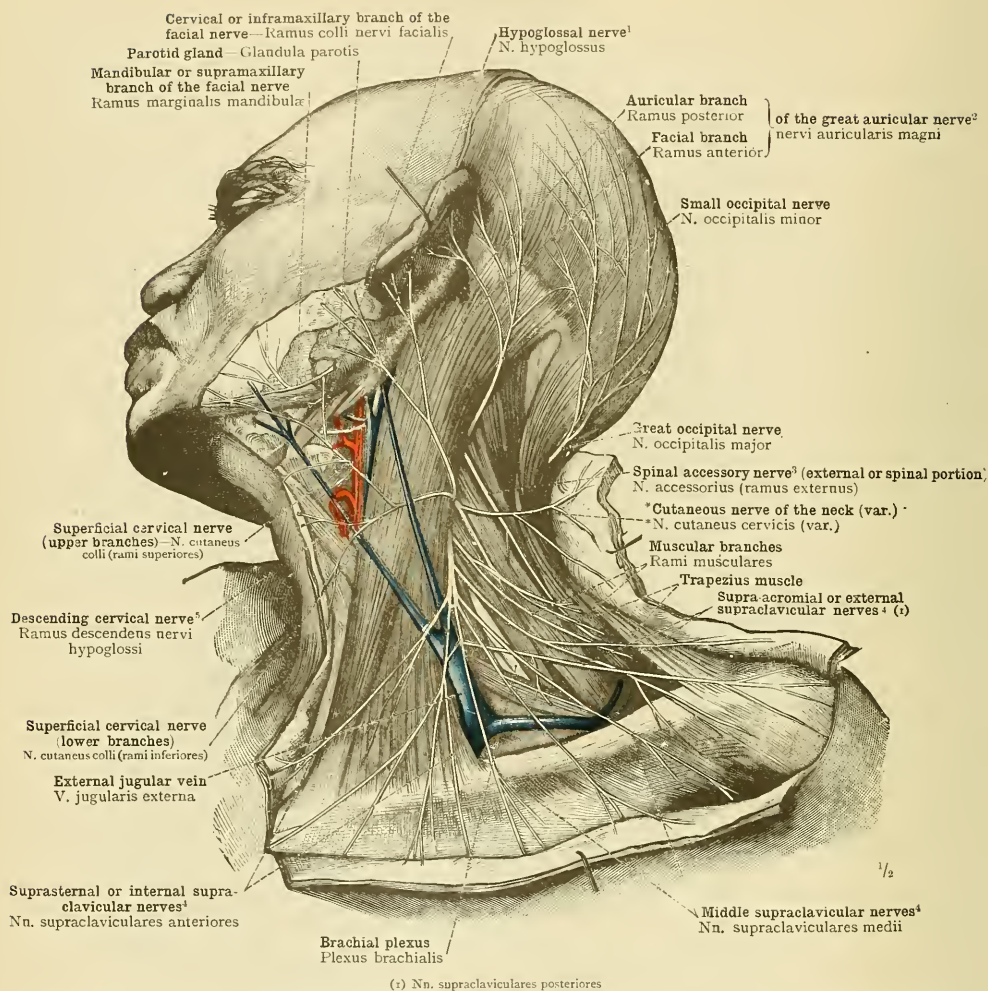


FIG. 1250.—THE CUTANEOUS NERVES OF THE HEAD AND NECK THAT ARE DERIVED FROM THE CERVICAL PLEXUS, AND THE MUSCULAR BRANCHES OF THE SAME PLEXUS THAT SUPPLY THE TRAPEZIUS AND LEVATOR ANGULI SCAPULÆ MUSCLES. THE EXTERNAL OR SPINAL PORTION OF THE SPINAL ACCESSORY NERVE. THE GREAT OCCIPITAL NERVE, N. OCCIPITALIS MAJOR. THE MANDIBULAR OR SUPRAMAXILLARY BRANCH OF THE FACIAL NERVE, RAMUS MARGINALIS MANDIBULÆ NERVI FACIALIS, AND THE COMMUNICATION BETWEEN THIS NERVE AND THE UPPER BRANCH OF THE SUPERFICIAL CERVICAL NERVE. N. CUTANEUS COLL.

The nerves are displayed by the removal of the platysma myoides and the deep cervical fascia.

¹ Twelfth cranial nerve in Soemmerring's enumeration, ninth cranial nerve in that of Willis; also known as the lingual motor nerve.

² See Appendix, note 425.

³ Eleventh cranial nerve in Soemmerring's enumeration; third trunk of the eighth cranial nerve in that of Willis.

⁴ See note ³ to p. 817.

⁵ Often called the descendens noni nerve. See Appendix, note 429.

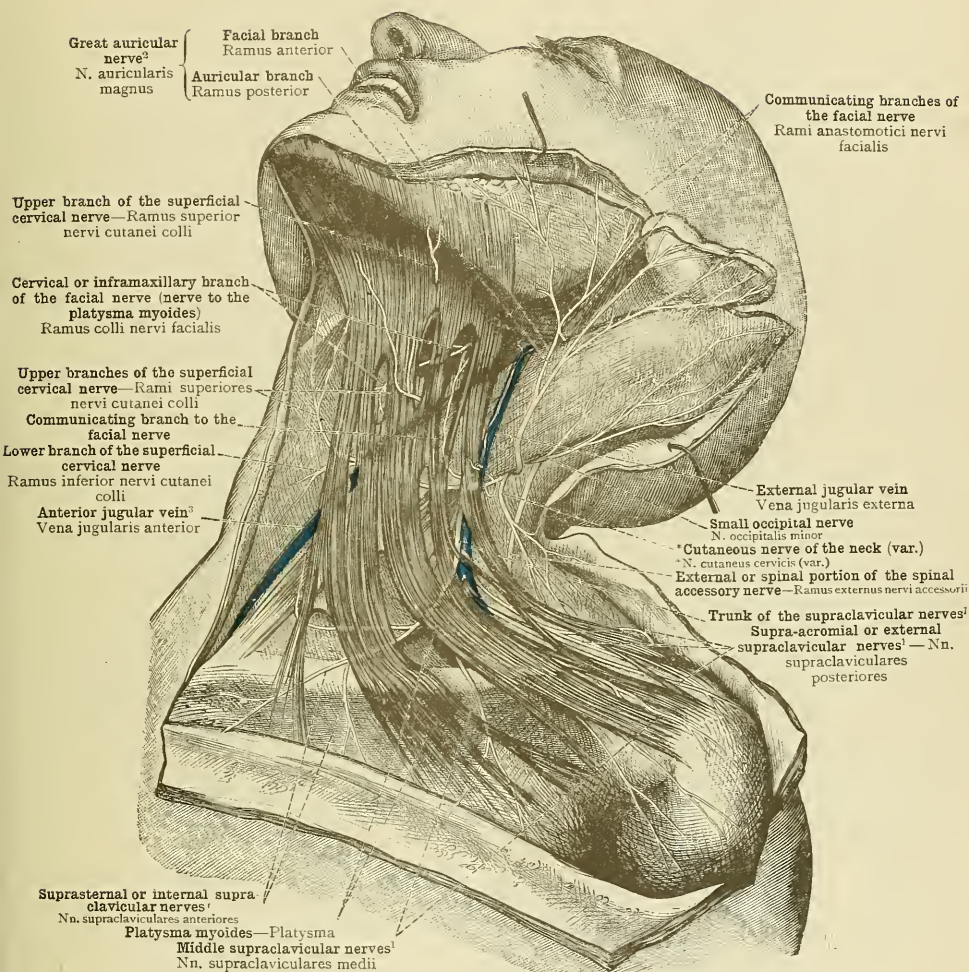
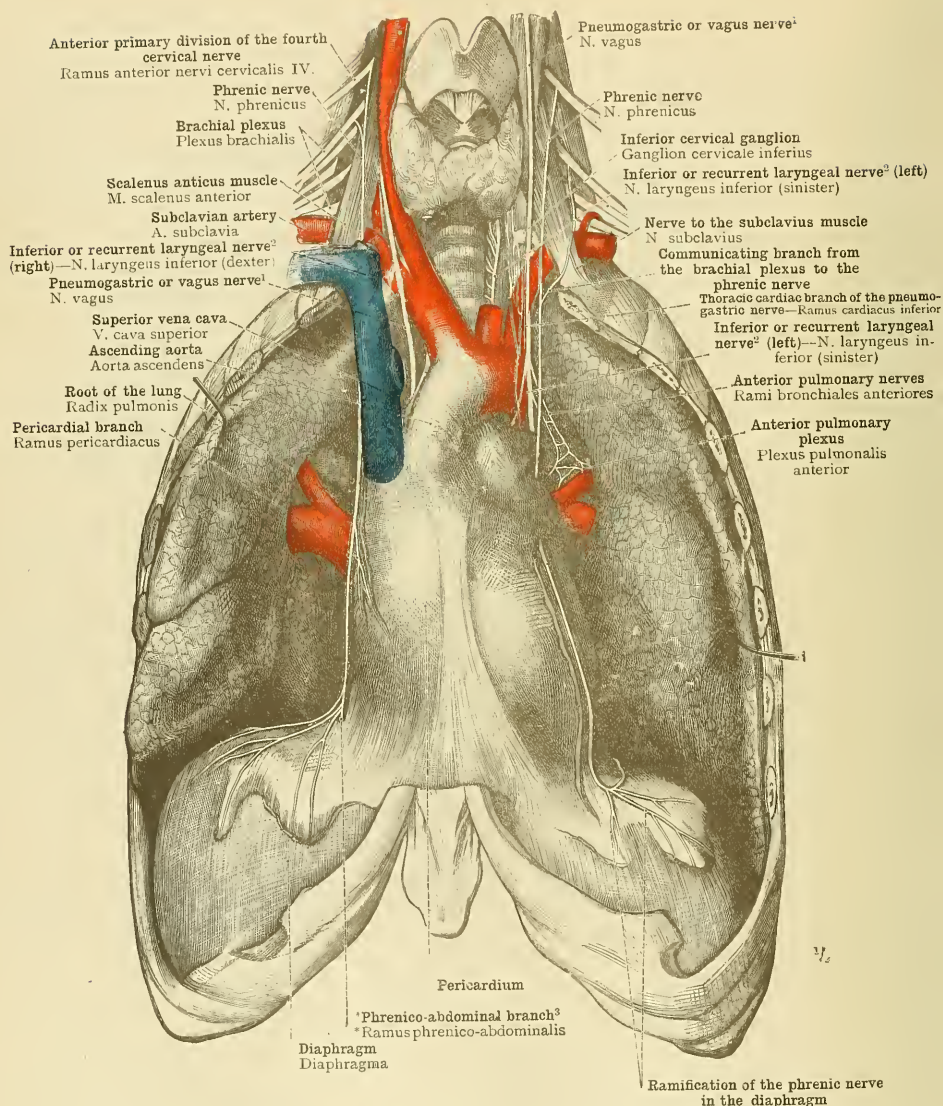
¹ See note 4 to p. 817.² See Appendix, note 473.³ Anterior jugular vein.—Macalister used the term *vena mediana colli* as an alternative name for this vein. See Appendix to Part V., note 497.

FIG. 1251.—THE CUTANEOUS NERVES OF THE HEAD AND NECK THAT ARE DERIVED FROM THE CERVICAL PLEXUS, IN RELATION TO THE PLATYSMA MYOIDES. THE FASCICULI OF THE LATTER ARE SEPARATED HERE AND THERE, IN ORDER TO DISPLAY IN THE INTERVALS THUS MADE THE NERVES COVERED BY THE MUSCLE.



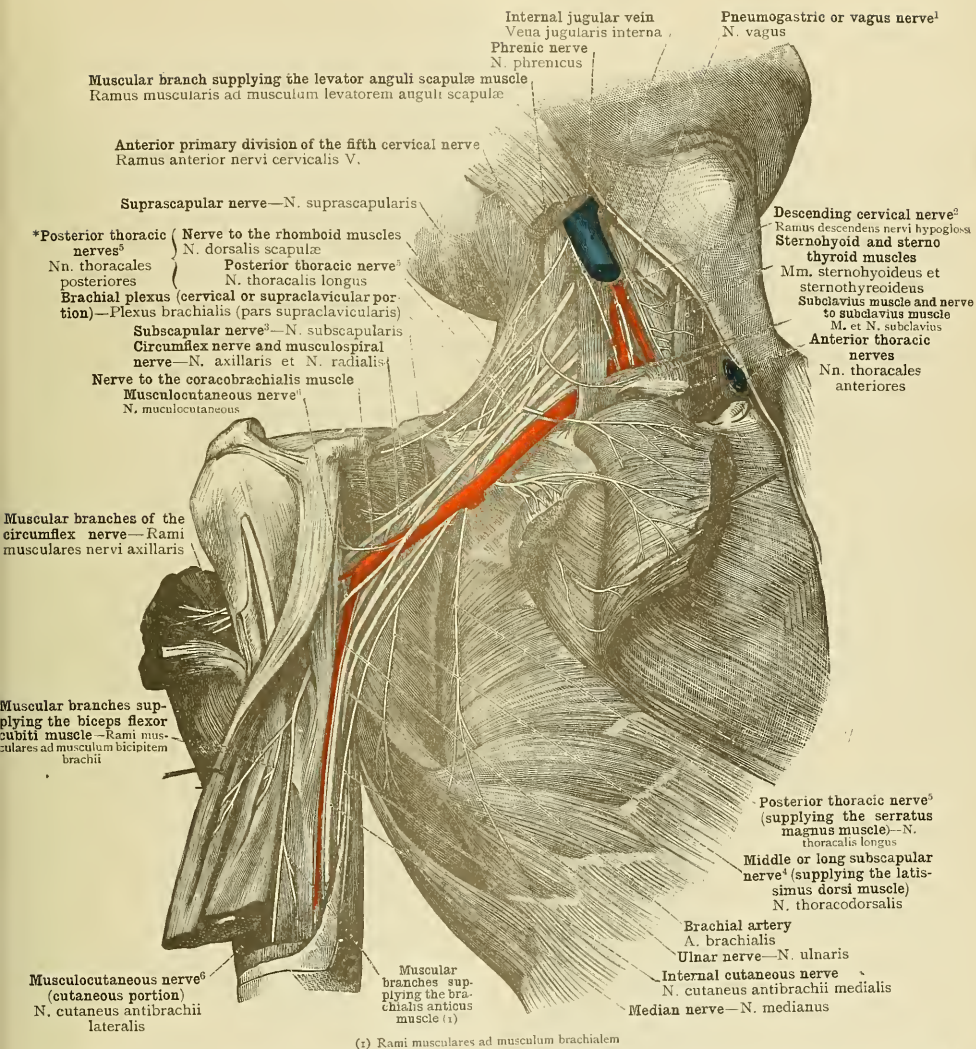
¹ First cranial nerve in Soemmering's enumeration; second trunk of the eighth cranial nerve in that of Willis.
² See note 3 to p. 872.

³ See Appendix, note 424.

FIG. 1252.—THE PHRENIC OR DIAPHRAGMATIC NERVE, NERVUS PHRENICUS, AND ITS RELATIONS WITH THE VAGUS NERVE.

In the thoracic region, the phrenic nerves were exposed by drawing apart the anterior borders of the lungs, and their course along the side of the pericardium was displayed by an incision through the pericardial pleura.

Nervus phrenicus—The phrenic nerve.



(1) Rami musculares ad musculus brachialem

FIG. 1253.—THE NERVES DERIVED FROM THE BRACHIAL PLEXUS FOR THE SUPPLY OF THE MUSCLES OF THE SHOULDER-JOINT, THE MUSCLES CONNECTING THE ARM WITH THE TRUNK, AND THE MUSCLES OF THE SHOULDER-GIRDLE. THE MOTOR OFFSETS OF THE MUSCULOCUTANEOUS (OR EXTERNAL CUTANEOUS) NERVE.

The pectoralis major and pectoralis minor muscles were cut across near their distal extremities and turned inwards; the muscles attached to the clavicle were also detached from that bone and turned aside; the deltoid muscle was divided and turned downwards; the biceps divided and turned outwards. The sternoclavicular and acromioclavicular articulations were cut through and the clavicle was removed.

¹ *Fourth cranial nerve* in Soemmerring's enumeration; *second trunk of the eighth cranial nerve* in that of Willis.

² Often called the *descendens noni nerve*. See Appendix, note 420.

³ See Appendix, note 416.

⁴ See Appendix, note 416.

⁵ See Appendix, note 425.

⁶ Sometimes called the *external cutaneous nerve*.

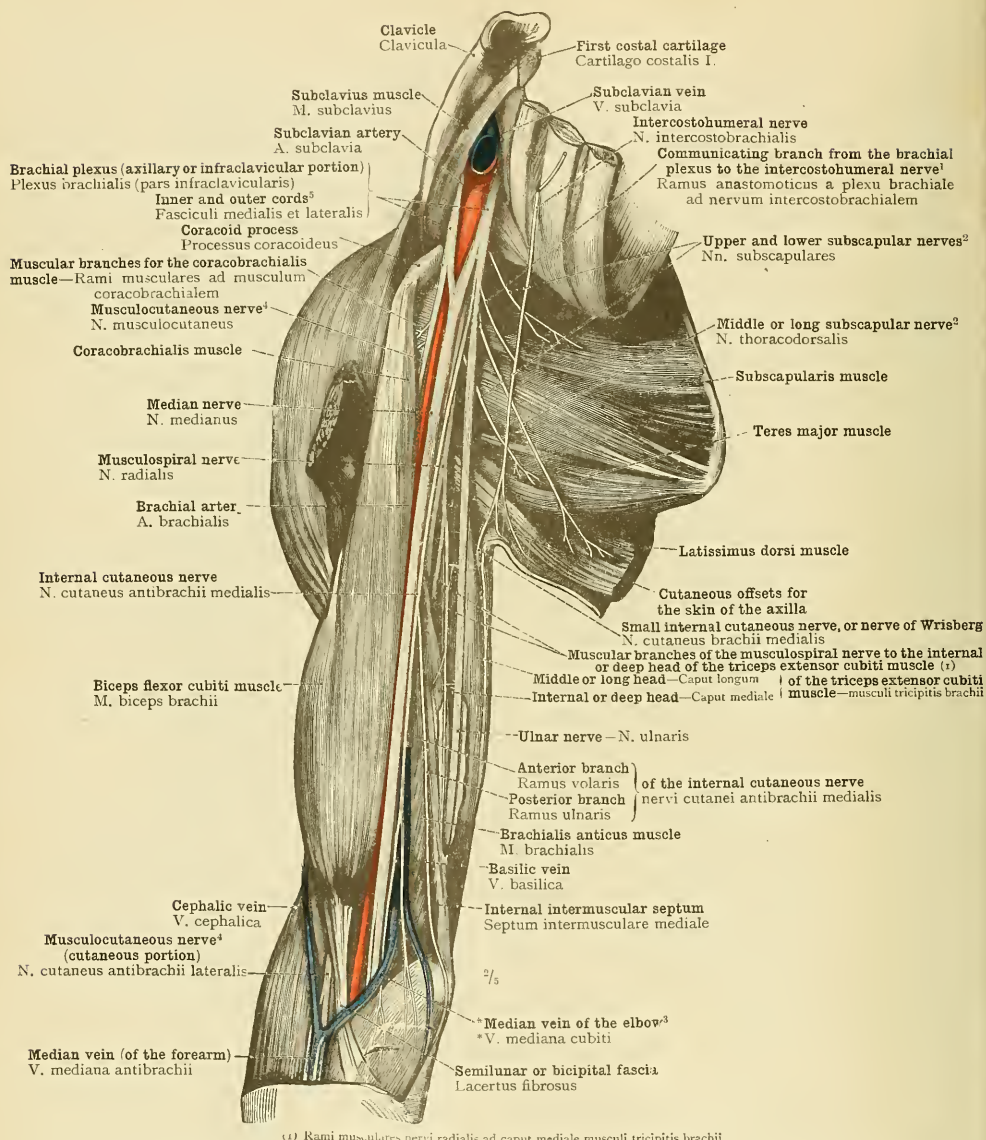


FIG. 1254.—THE DEEP NERVES OF THE SHOULDER AND THE UPPER ARM, SEEN FROM BEFORE AND THE INNER SIDE.

¹ The communication between the brachial plexus and the intercostobumeral nerve is usually effected by means of a branch of the small internal cutaneous nerve (nerve of Wrisberg).
² See Appendix, note 418.
³ See Appendix to Part V., note 395.
⁴ Sometimes called the *external cutaneous nerve*.
⁵ See Appendix, note 426.

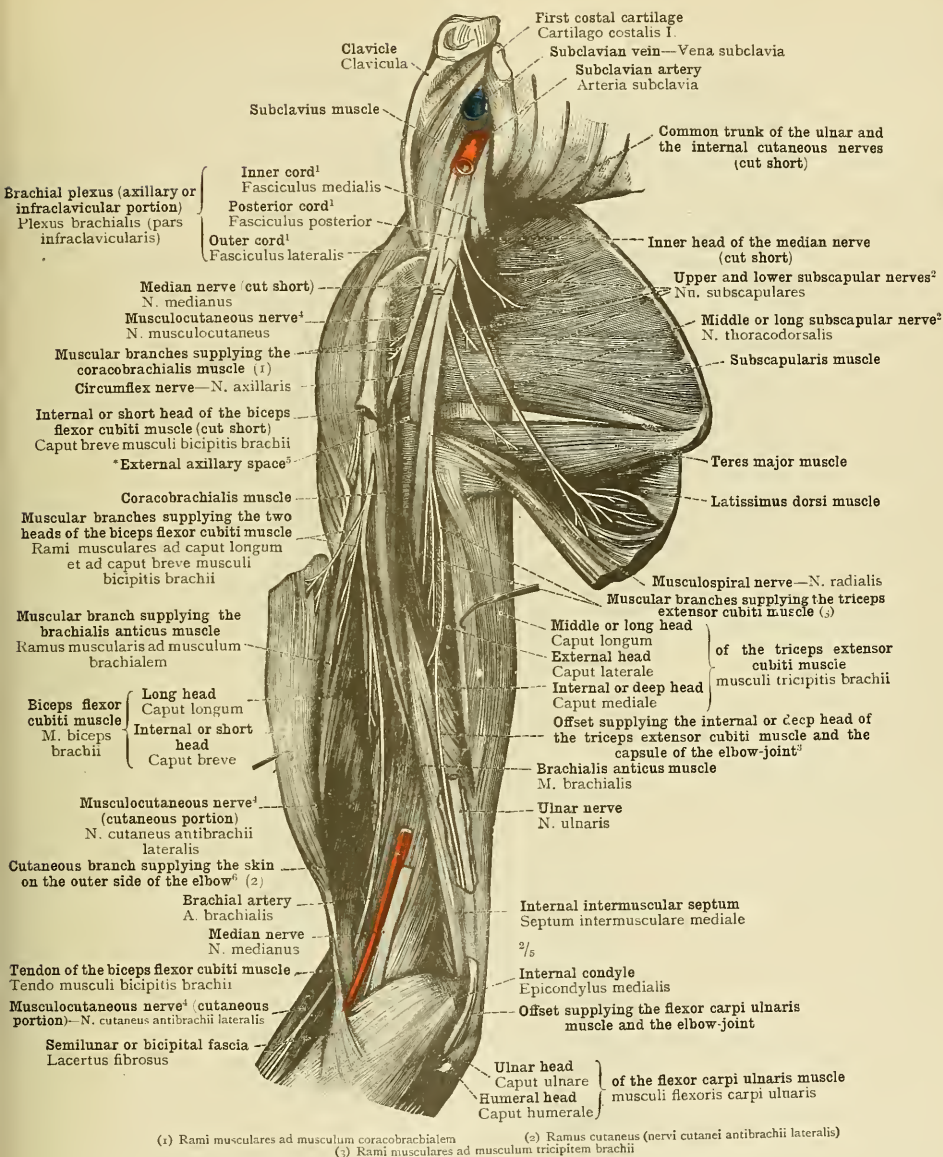
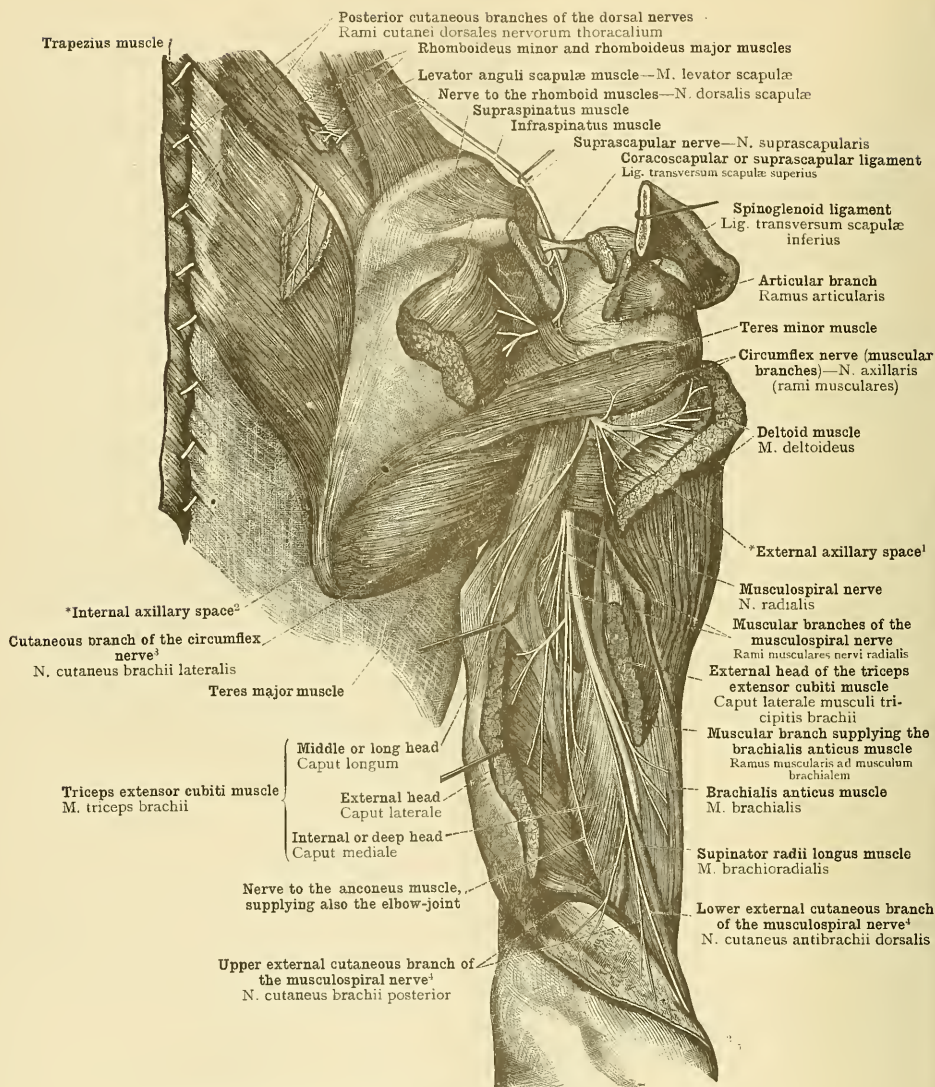


FIG. 1255.—THE DEEP NERVES OF THE SHOULDER AND THE UPPER ARM, SEEN FROM BEFORE AND THE INNER SIDE, AFTER REMOVING THE ULNAR AND MEDIAN NERVES.

The upper part of the internal or short head of the biceps flexor cubiti muscle was removed, while the lower part of the muscle was turned outwards, in order to display the nerves entering the biceps flexor cubiti and brachialis anticus muscles.



¹ Called by Macalister the *quadrilateral space*. See note ¹ to p. 312, in Part III.

² Called by Macalister the *subscapular triangle*. See note ¹ to p. 312, in Part III.

³ Sometimes called the *lower branch of the circumflex nerve*, but the name used in the text is more distinctive.

⁴ See Appendix, note 429.

FIG. 1256.—THE NERVES SUPPLYING THE MUSCLES OF THE SHOULDER-JOINT AND THE TRICEPS EXTENSOR CUBITI MUSCLE, ALSO THE CUTANEOUS OFFSETS OF THE CIRCUMFLEX AND MUSCULOSPIRAL NERVES, DISPLAYED FROM BEHIND. THE RAMIFICATION OF THE NERVE TO THE RHOMBOID MUSCLES (N. DORSALIS SCAPULAE).

The spine of the scapula was sawn across, the detached segment was drawn outwards, and the supraspinatus and infraspinatus muscles were cut across. The external head of the triceps extensor cubiti muscle was divided by an oblique section, and the segments were drawn apart.

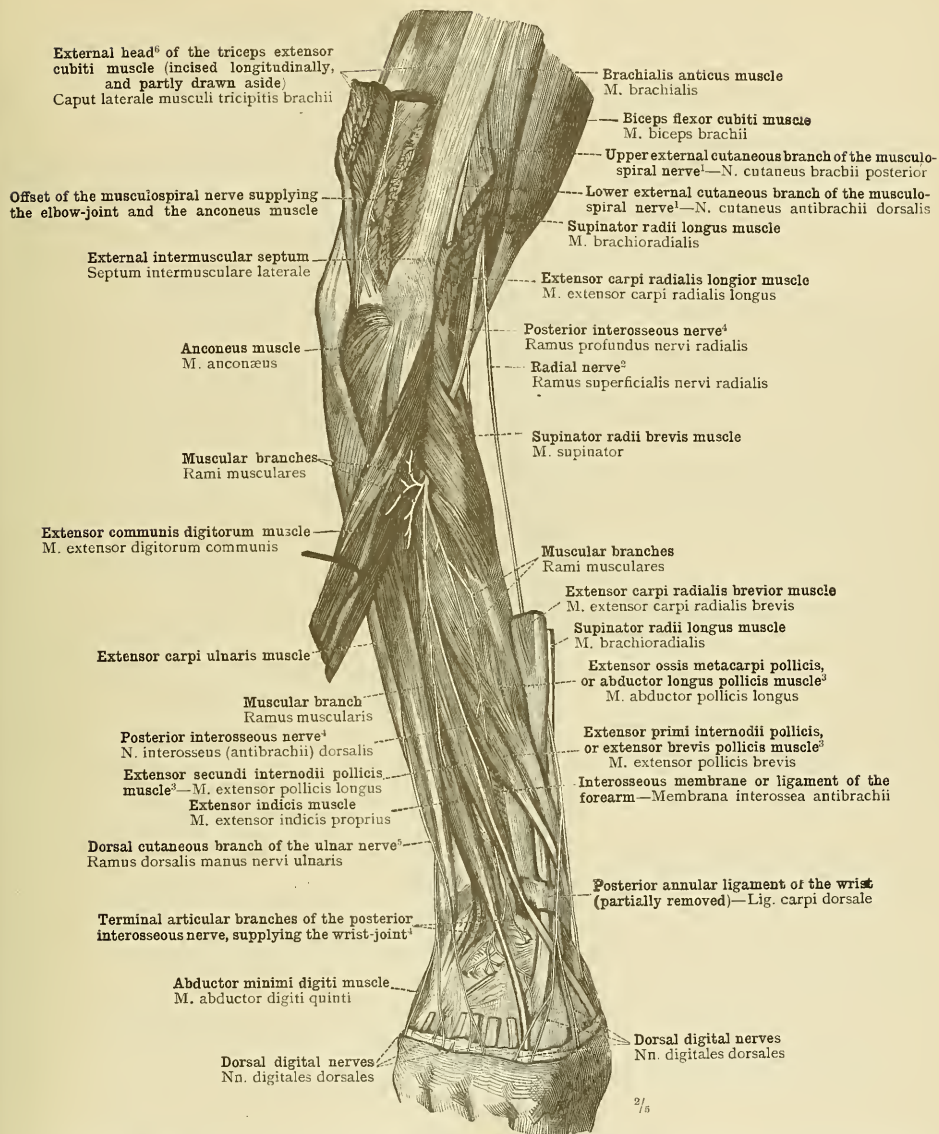


FIG. 1257.—THE DEEP NERVES OF THE DORSAL SIDE OF THE FOREARM. THE NERVE TO THE ANCONÆUS MUSCLE (A BRANCH OF THE MUSCULOSPIRAL NERVE) AND THE BRANCHES OF THIS NERVE TO THE ELBOW-JOINT WERE EXPOSED BY AN INCISION INTO THE EXTERNAL HEAD⁶ OF THE TRICEPS EXTENSOR CUBITI MUSCLE.

¹ See Appendix, note 429.

² See Appendix, note 430.

³ See note 1 to p. 326, in Part III.

⁴ See Appendix, note 431.

⁵ Also called *dorsal branch of the ulnar nerve* and *dorsal cutaneous nerve of the hand*, but both these names are less distinctive than that used in the text, which is employed by Macalister.

⁶ See Appendix, note 435.

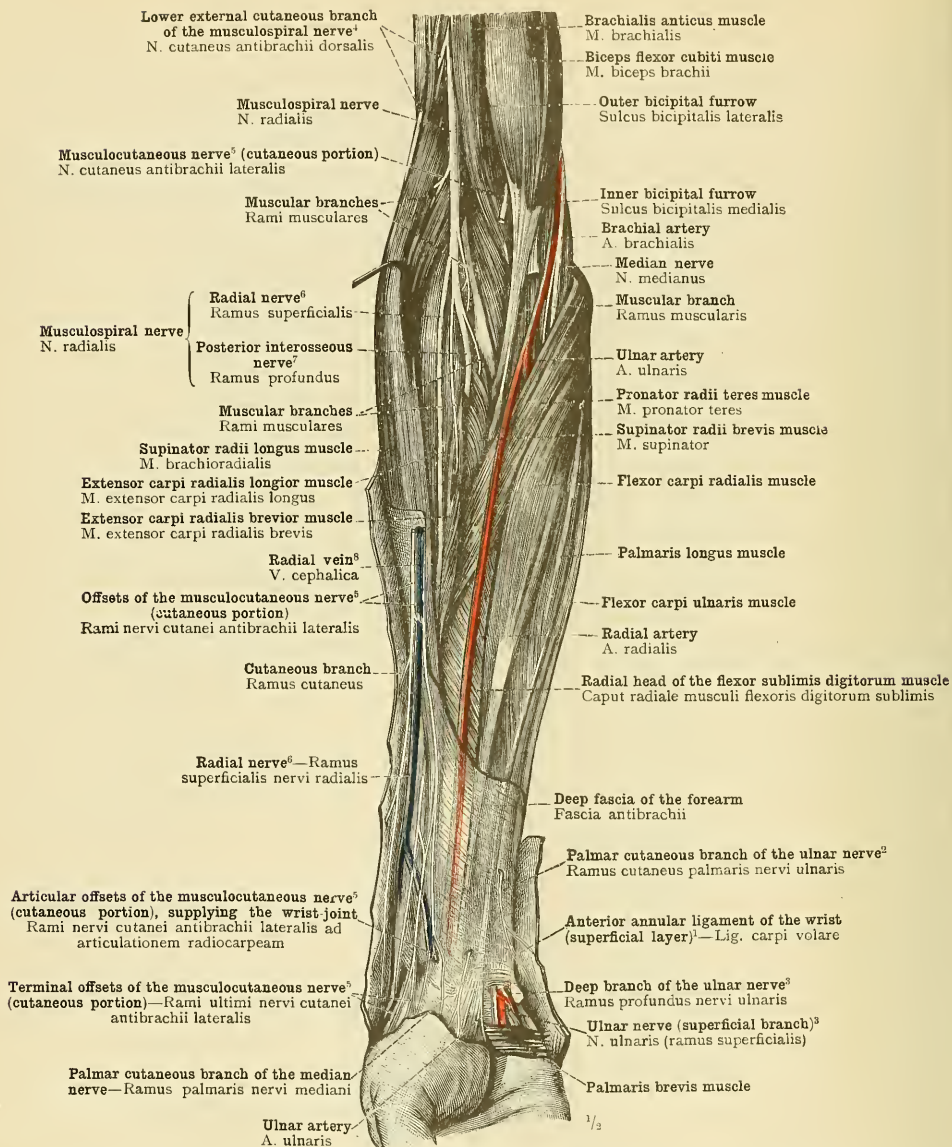


FIG. 1258.—THE DEEP NERVES OF THE PALMAR SIDE OF THE FOREARM, MORE ESPECIALLY THE COURSE AND DISTRIBUTION OF THE MUSCULOSPIRAL NERVE, DISPLAYED BY THE REMOVAL OF THE DEEP FASCIA OF THE FOREARM.

¹ See Appendix to Part V., note 214.

² In Ellis's "Demonstrations of Anatomy" this branch is called the *cutaneous nerve of the forearm and hand*—a name greatly lacking in precision.

³ See Appendix, note 433.

⁴ See Appendix, note 429.

⁵ Sometimes called the *external cutaneous nerve*.

⁶ See Appendix, note 439.

⁷ See Appendix, note 434.

⁸ Called by Macalister the *superficial radial vein*. With regard to the author's use of the term *vena cephalica*, see Appendix to Part V., note 395.

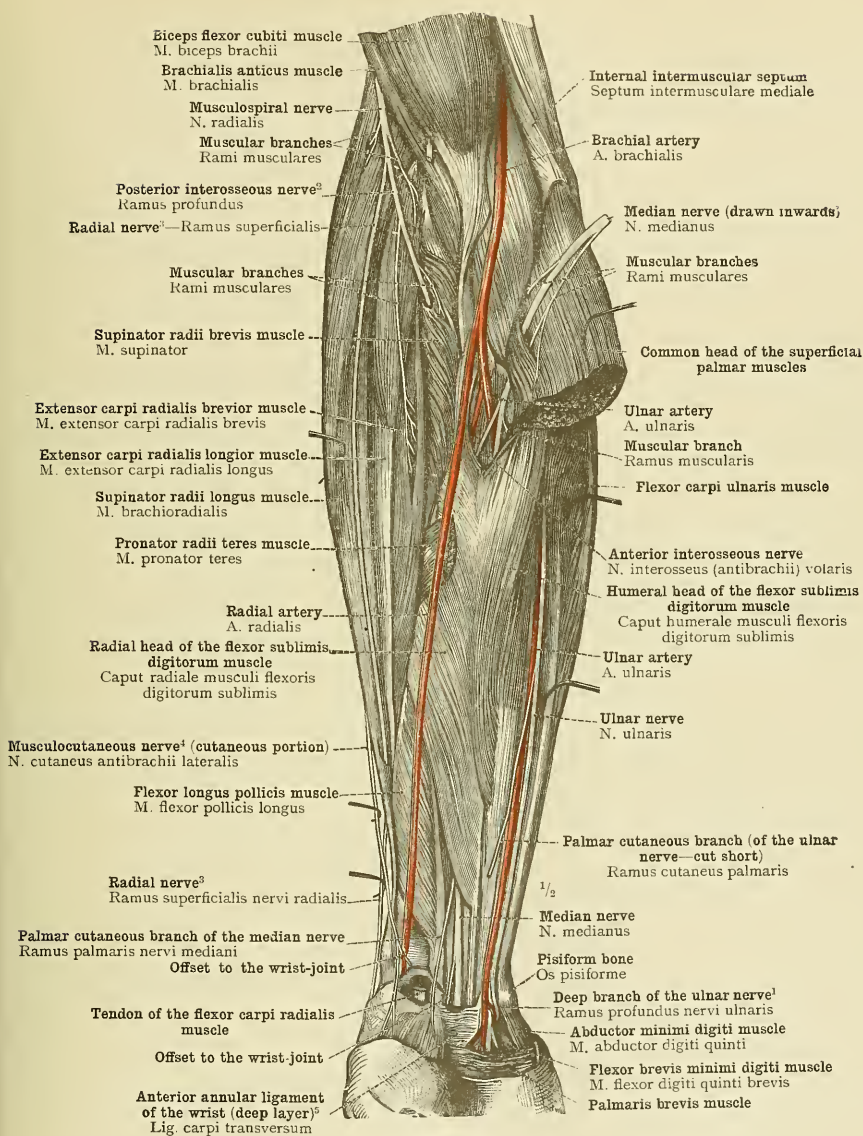
¹ See Appendix, note 433.² See Appendix, note 434.³ See Appendix, note 439.⁴ Sometimes called the *external cutaneous nerve*.⁵ See Appendix to Part V., note 214.

FIG. 1259.—THE DEEP NERVES OF THE PALMAR SIDE OF THE FOREARM, DISPLAYED BY THE PARTIAL REMOVAL OF THE PRONATOR RADII TERES, FLEXOR CARPI RADIALIS, AND PALMARIS LONGUS MUSCLES. THE PASSAGE OF THE MEDIAN NERVE BETWEEN THE TWO HEADS OF THE PRONATOR RADII TERES MUSCLE.

The muscles of the radial group (supinator and extensor muscles) have been separated a little one from another.

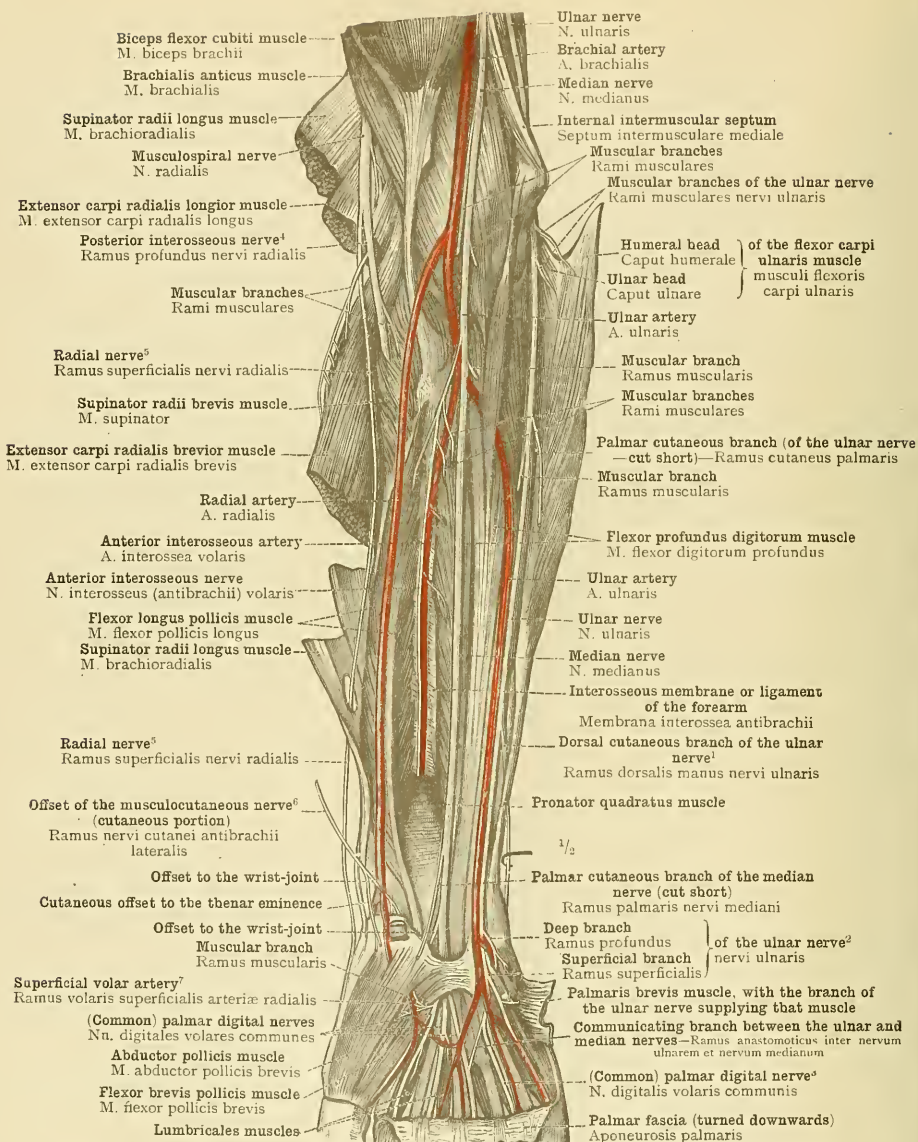
¹ See note 5 to p. 825.⁵ See Appendix, note 430.⁷ Often known in England by the Latin name of *superficialis volæ artery*.² See Appendix, note 431.⁶ Sometimes called the *external cutaneous nerve*.³ See Appendix, note 434.⁴ See Appendix, note 432.

FIG. 1260.—THE DEEP NERVES OF THE PALMAR SIDE OF THE FOREARM, DISPLAYED BY THE REMOVAL OF THE FLEXOR SUBLIMIS DIGITORUM, SUPINATOR RADII LONGUS, EXTENSOR CARPI RADIALIS LONGIOR, AND EXTENSOR CARPI RADIALIS BREVIS MUSCLES.

The flexor longus pollicis muscle has been drawn apart from the flexor profundus digitorum muscle.

Nerves of the Forearm.

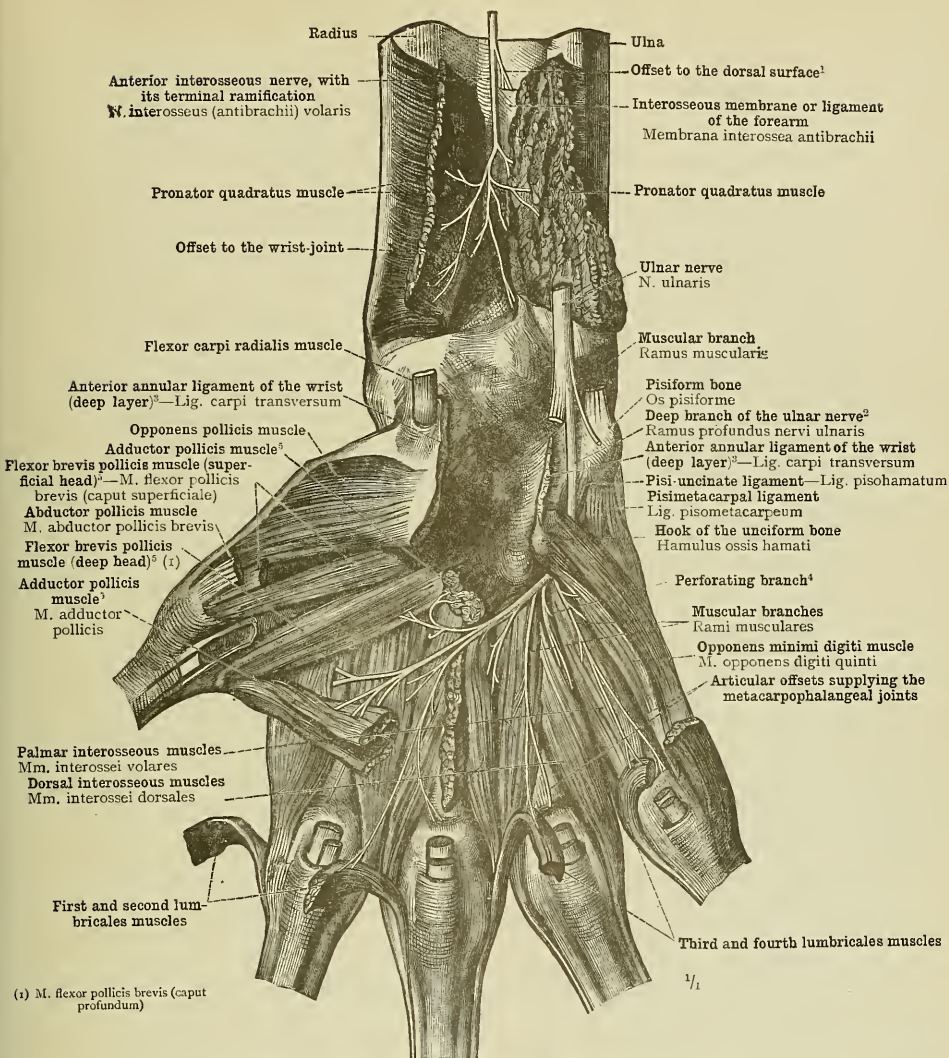
¹ Not mentioned by Quain or Macalister.² See Appendix, note 433.³ See Appendix to Part V., note 214.⁴ See Appendix, note 435.⁵ See note ² to p. 324, in Part III.

FIG. 1261.—THE TERMINAL RAMIFICATION OF THE ANTERIOR INTEROSSEOUS NERVE, **N. INTEROSSEUS (ANTI-BRACHII) VOLARIS**, IN THE SUBSTANCE OF THE PRONATOR QUADRATUS MUSCLE, AND THE ARTICULAR BRANCH OF THIS NERVE TO THE WRIST-JOINT. THE DISTRIBUTION OF THE DEEP BRANCH OF THE ULNAR NERVE (see Appendix, note 433) TO THE MUSCLES OF THE METACARPUS AND TO THE METACARPOPHALANGEAL JOINTS.

The terminal ramification of the anterior interosseous nerve was exposed by making a vertical incision through the middle of the pronator quadratus muscle and drawing the segments apart. To expose the deep branch of the ulnar nerve in the palm of the hand, partial removal of the muscles of the thenar eminence was required.

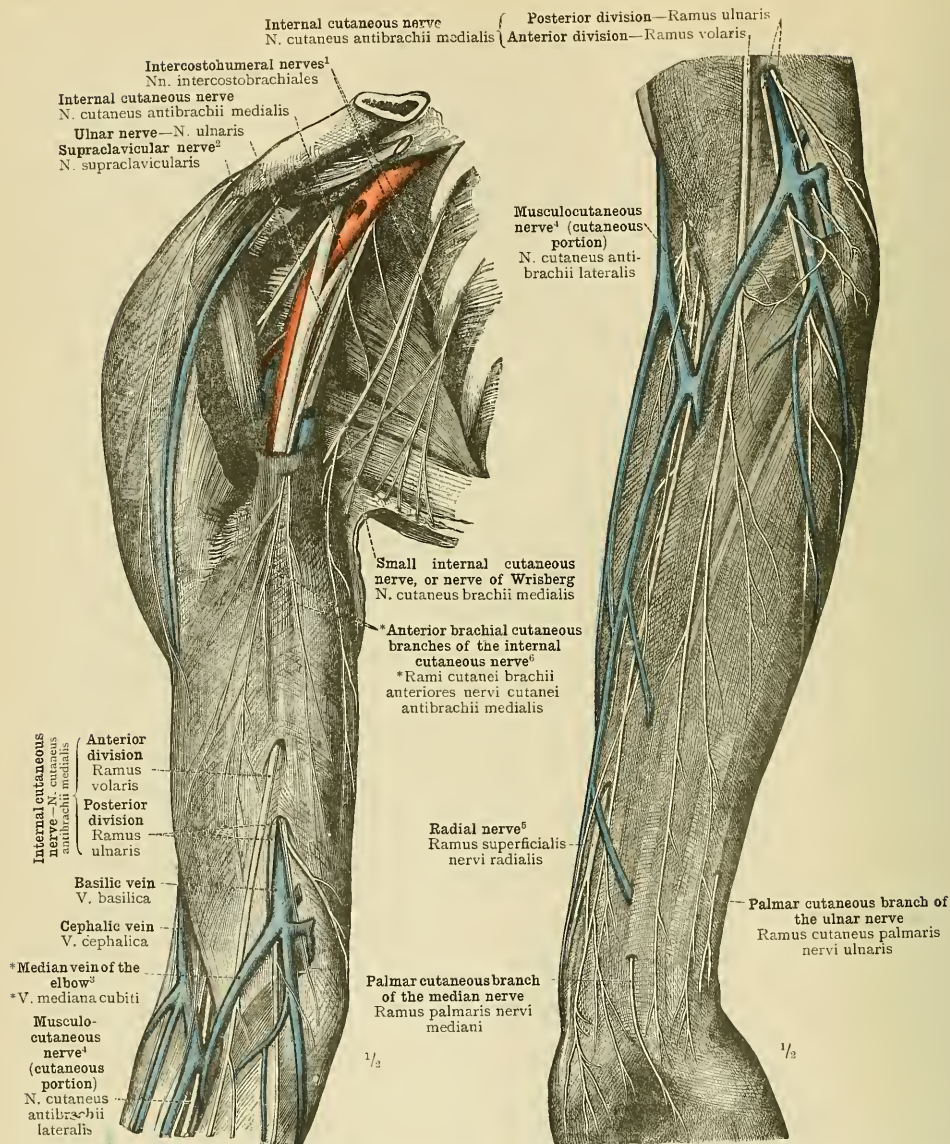


FIG. 1262.—THE CUTANEOUS NERVES OF THE ANTERIOR AND INNER SIDES OF THE UPPER ARM.

FIG. 1263.—THE CUTANEOUS NERVES OF THE PALMAR SURFACE OF THE FOREARM.

¹ See description at the foot of Fig. 1247, p. 815.
⁴ Sometimes called the *external cutaneous nerve*.

² See note ⁴ to p. 817.
⁵ See Appendix, note 43^o.

³ See Appendix to Part V., note 30^o.
⁶ See Appendix, note 43^o.

Cutaneous Nerves of the Upper Limb.

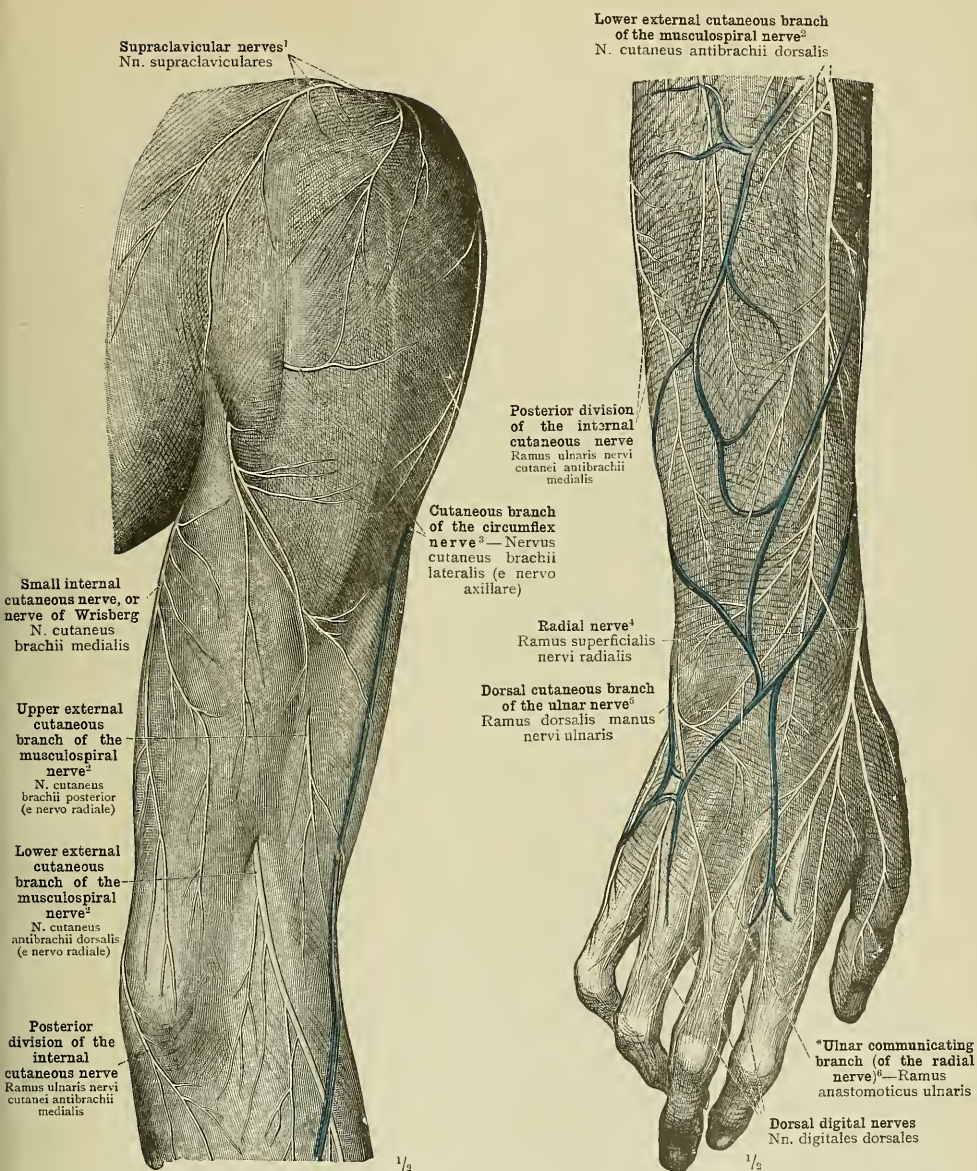


FIG. 1264.—THE CUTANEOUS NERVES OF THE BACK OF THE UPPER ARM.

FIG. 1265.—THE CUTANEOUS NERVES OF THE BACK OF THE FOREARM AND HAND.

¹ The hindmost of these nerves is distinguished as the *external* or *posterior* branch of the *supraclavicular nerves*, or as the *supra-acromial* nerve. See note ⁴ to p. 817.

² See Appendix, note 429.

⁴ See Appendix, note 439.

³ Sometimes called the *lower branch of the circumflex nerve*, but the name used in the text is more distinctive.

⁵ See note 5 to p. 825.

⁶ See Appendix, note 437.

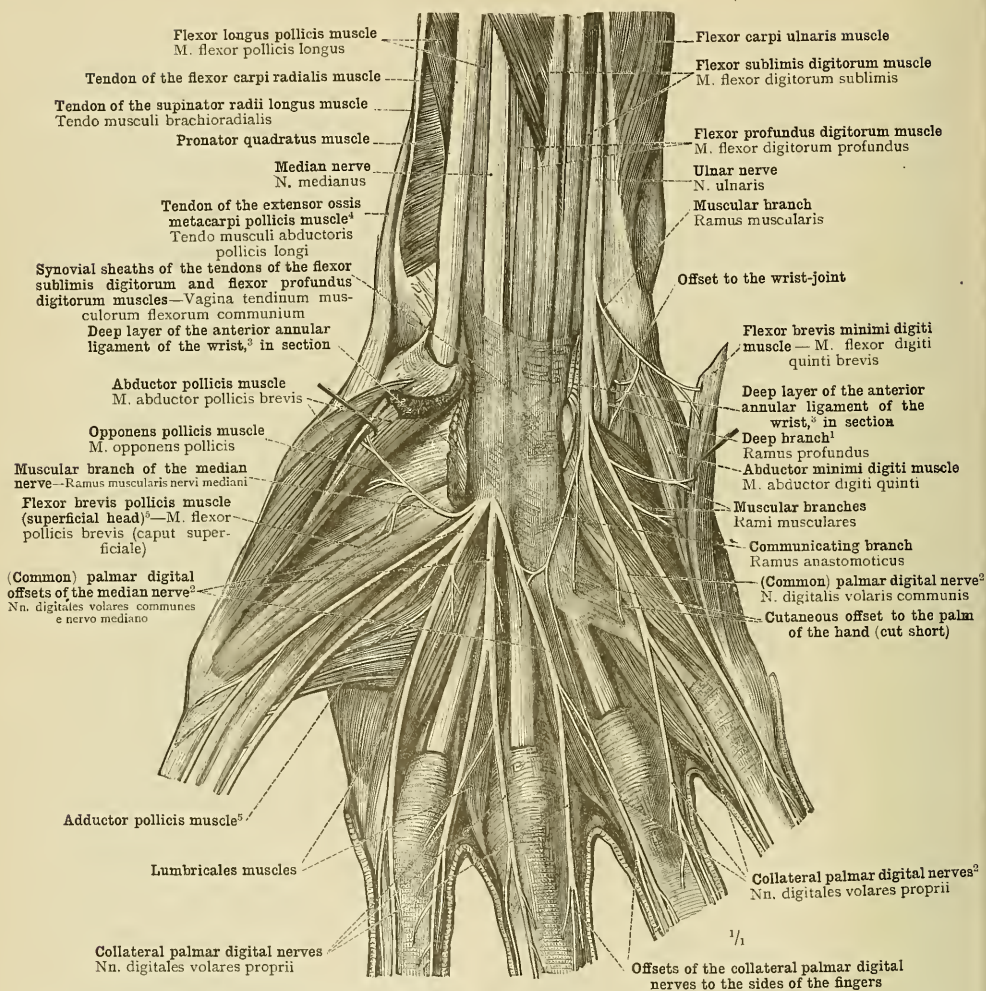


FIG. 1266.—THE DISTRIBUTION OF THE NERVES ON THE PALMAR SURFACE OF THE METACARPUS, DISPLAYED BY THE REMOVAL OF THE DEEP LAYER OF THE ANTERIOR ANNULAR LIGAMENT OF THE WRIST (LIGAMENTUM CARPI TRANSVERSUM—see Appendix to Part V., note ²¹⁴) AND THE PALMAR FASCIA (APONEUROSIS PALMARIS). THE PASSAGE OF THE MEDIAN NERVE (N. MEDIANUS) THROUGH THE CANAL OF THE CARPI (CANALIS CARPI), IN WHICH THE NERVE IS IMBEDDED IN THE ANTERIOR WALL OF THE COMMON SYNOVIAL SHEATH OF THE FLEXOR TENDONS. THE PROXIMAL EXTREMITIES OF THE ABDUCTOR POLLICIS AND FLEXOR BREVIS MINIMI DIGITI MUSCLES HAVE BEEN CUT THROUGH, AND THE MUSCLES HAVE BEEN TURNED OUTWARDS AND INWARDS, RESPECTIVELY, IN ORDER TO DISPLAY THE MUSCULAR BRANCHES TO THE MUSCLES OF THE THENAR AND HYPOTHENAR EMINENCES.

¹ See Appendix, note ⁴³³.

⁴ See note ¹ to p. 326, in Part III.

² See Appendix, note ⁴³⁴.

⁵ See note ² to p. 324, in Part III.

³ See Appendix to Part V., note ²¹⁴.

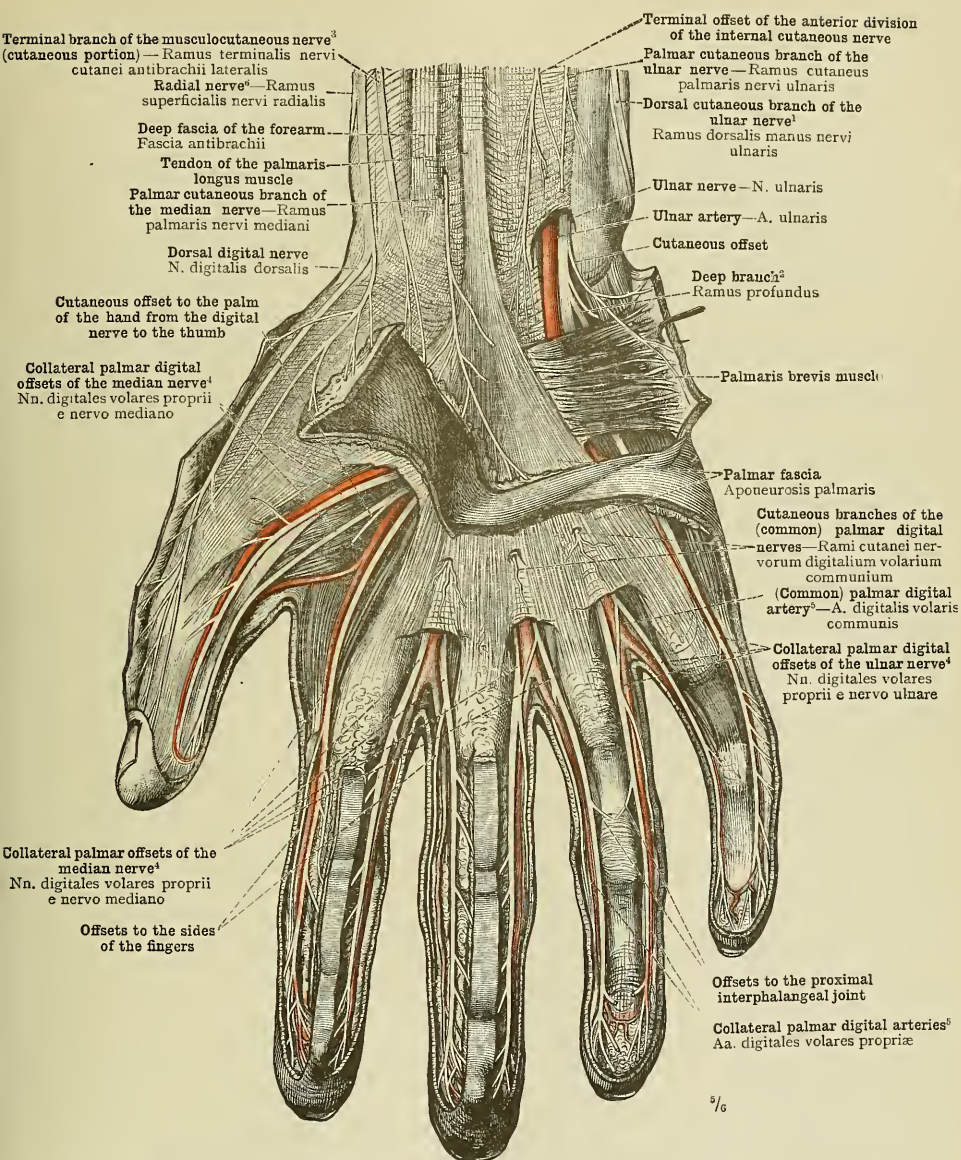


FIG. 1267.—THE SUPERFICIAL NERVES OF THE PALMAR SURFACE OF THE METACARPUS AND THE FINGERS.

¹ See note 5 to p. 825.² See Appendix, note 433.³ Sometimes called the *external cutaneous nerve*.⁴ See Appendix, note 434.⁵ See Appendix to Part V., note 213.⁶ See Appendix, note 439.

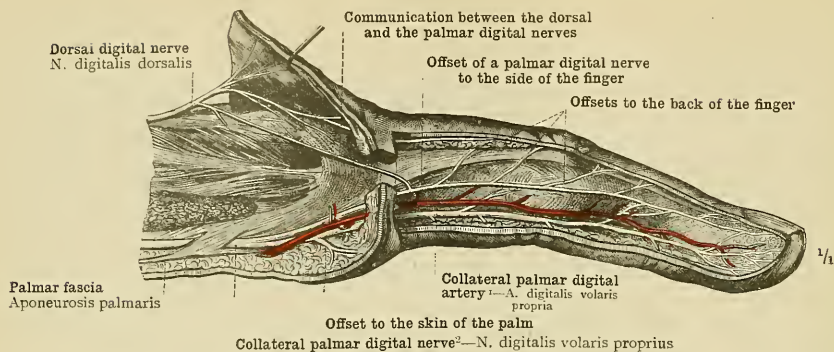
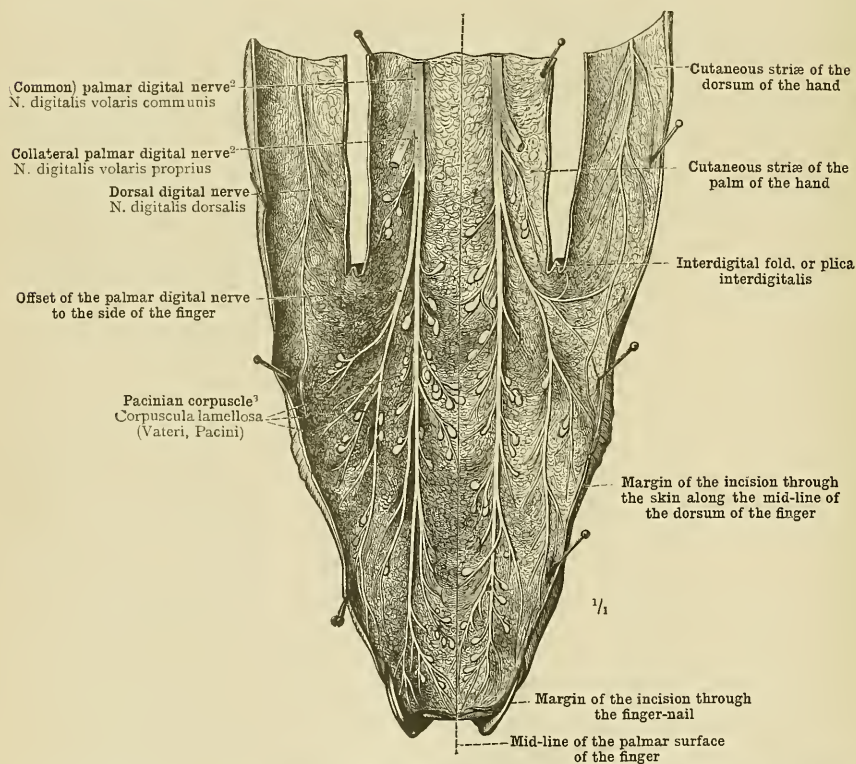


FIG. 1268.—THE PALMAR AND DORSAL NERVES OF THE RIGHT MIDDLE FINGER, SEEN FROM THE ULNAR SIDE.

FIG. 1269.—THE PALMAR AND DORSAL NERVES OF THE MIDDLE FINGER, AS SEEN IN THE DETACHED SKIN. PACINIAN CORPUSCLES (see note ³ below).¹ See Appendix to Part V., note 213.² See Appendix, note 434.³ Called also Pacinian body, and sometimes corpuscle of Vater. See Appendix, note 325.

Cutaneous Nerves of the Hand.

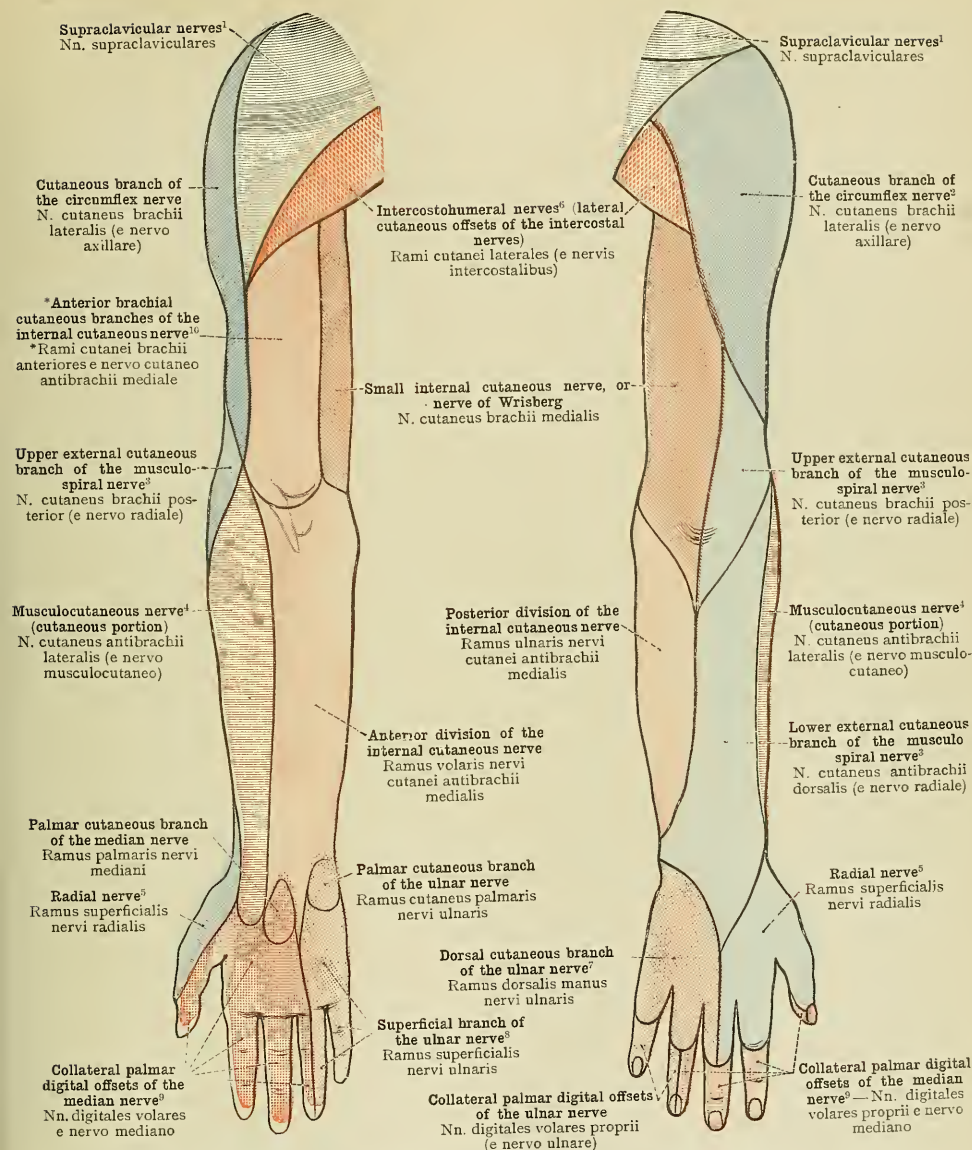


FIG. 1270.—THE CUTANEOUS AREAS OF THE BRACHIAL NERVES ON THE ANTERIOR OR PALMAR SURFACE OF THE UPPER EXTREMITY.

FIG. 1271.—THE CUTANEOUS AREAS OF THE BRACHIAL NERVES ON THE POSTERIOR OR DORSAL SURFACE OF THE UPPER EXTREMITY.

¹ See note 4 to p. 817.

² Sometimes called the *lower branch of the circumflex nerve*, but the name used in the text is more distinctive.

³ See Appendix, note 420.

⁴ See Appendix, note 420.

⁵ See note 5 to p. 825.

⁶ Sometimes called the *lower branch of the circumflex nerve*.

⁷ See description at the foot of Fig. 1247, p. 815.

⁸ See Appendix, note 433.

⁹ See Appendix, note 434.

¹⁰ See Appendix, note 436.

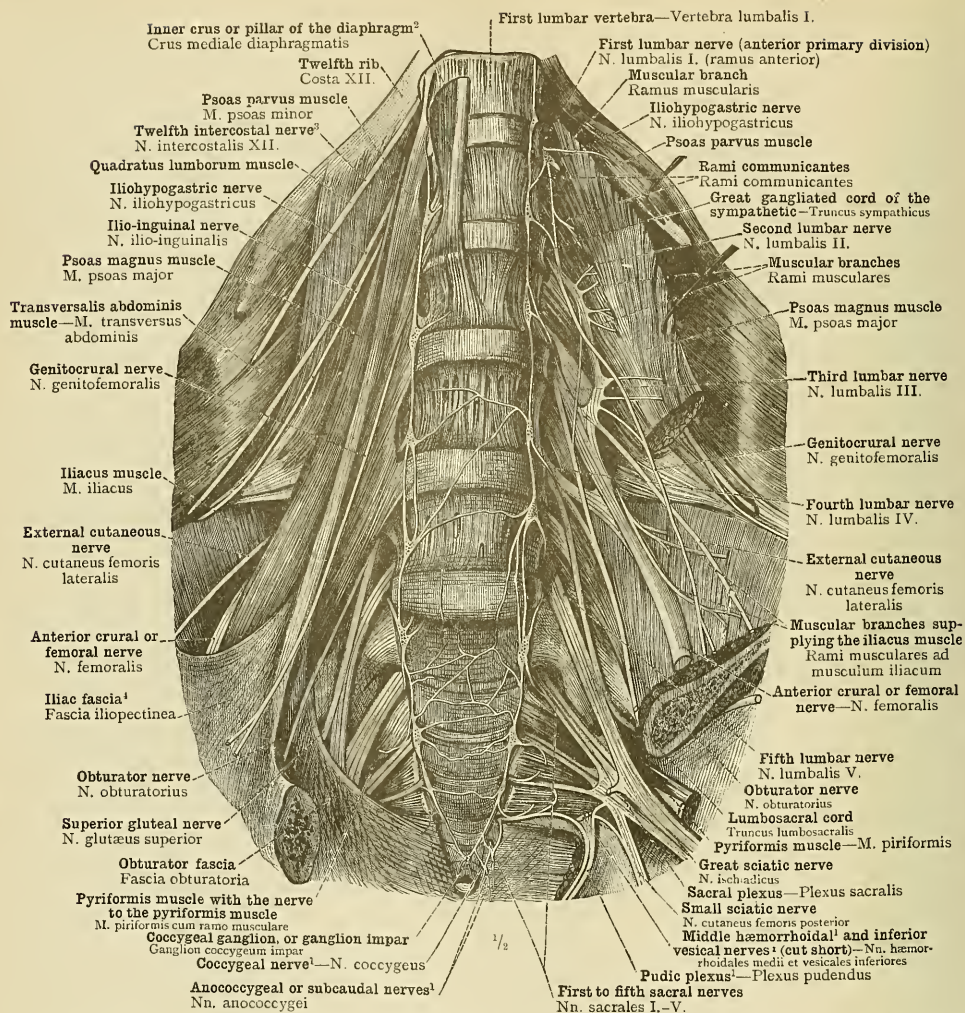


FIG. 1272.—THE *LUMBOSACRAL PLEXUS, PLEXUS LUMBOSACRALIS, COMPRISING THE LUMBAR PLEXUS, PLEXUS LUMBALIS, THE SACRAL PLEXUS, PLEXUS SACRALIS, AND THE PUDIC PLEXUS, PLEXUS PUDENDUS (see *Appendix*, note ⁴³⁸). THE FORMATION OF THE LUMBAR PLEXUS, PLEXUS LUMBALIS, OUT OF THE ANTERIOR PRIMARY DIVISIONS OF THE FIRST, SECOND, THIRD, AND PART OF THE FOURTH LUMBAR NERVES; THE JUNCTION OF THE REMAINING PORTION OF THE FOURTH LUMBAR NERVE (NERVUS FURCALIS) WITH THE FIFTH LUMBAR NERVE TO FORM THE LUMBOSACRAL CORD, TRUNCUS LUMBOSACRALIS. THE FORMATION OF THE SACRAL PLEXUS, PLEXUS SACRALIS (see *Appendix*, note ⁴³⁸), OUT OF THE LUMBOSACRAL CORD AND THE ANTERIOR PRIMARY DIVISIONS OF THE FIRST, SECOND, AND THIRD SACRAL NERVES. THE FORMATION OF THE PUDIC PLEXUS, PLEXUS PUDENDUS, OUT OF PORTIONS OF THE THIRD, FOURTH, AND FIFTH SACRAL NERVES.

On the left side of the body the psoas magnus and psoas parvus muscles were detached from the bodies of the lumbar vertebrae, and the great sacrosacral foramen, foramen ischiadicum majus, was opened from before by the removal of a large segment of the hip-bone.

¹ See *Appendix*, note ⁴³⁸.

³ Sometimes distinguished as the *subcostal nerve*.

² See note ¹ to p. 286, in Part III.

⁴ See note ¹ to p. 390, in Part III.

*Plexus lumbosacralis—*Lumbosacral plexus.

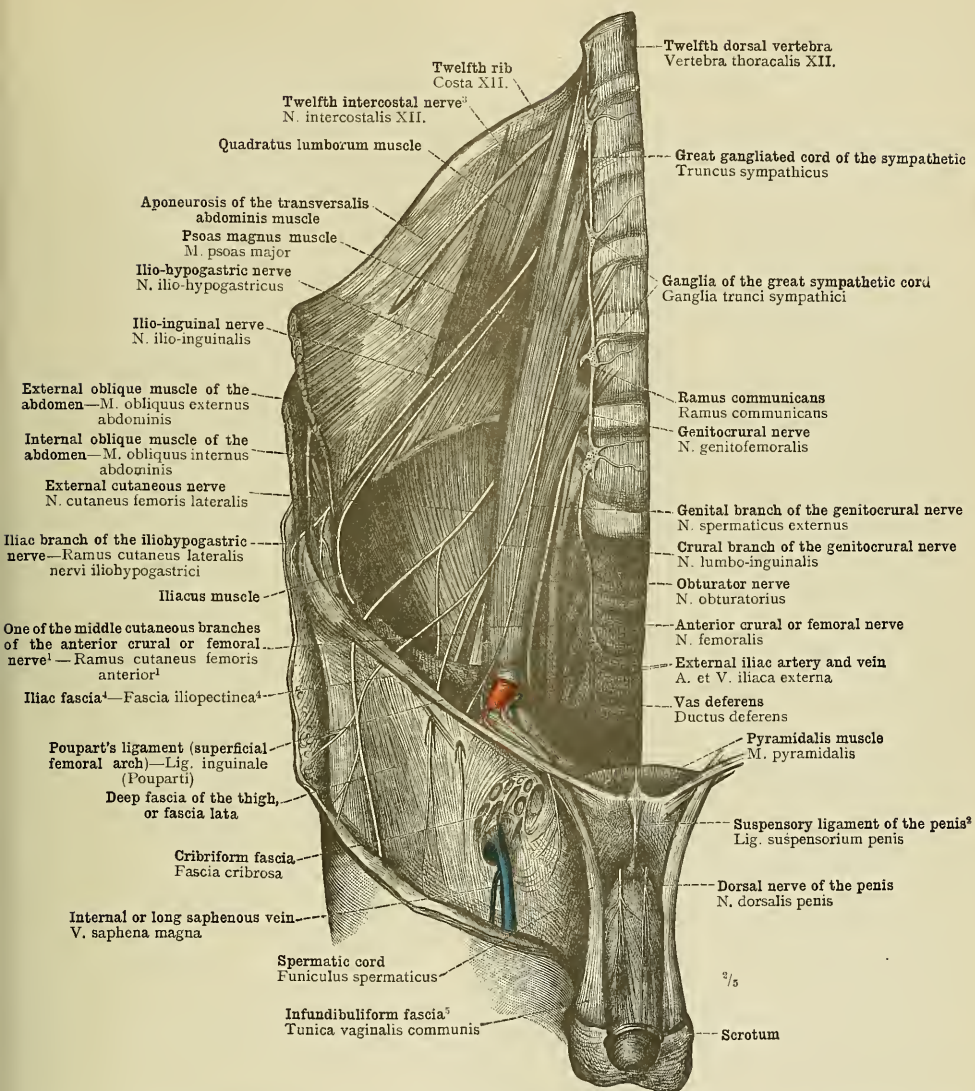


FIG. 1273.—THE NERVES ARISING FROM THE LUMBAR PLEXUS, AND THE PASSAGE OF THE GENITOCRURAL AND EXTERNAL CUTANEOUS NERVES (NN. GENITOFEMORALIS ET CUTANEUS FEMORIS LATERALIS) INTO THE THIGH. THE RAMIFICATION OF THE DORSAL NERVE OF THE PENIS (N. DORSALIS PENIS) ON THE DORSUM OF THE PENIS.

The ilio-inguinal nerve has been cut short just above the anterior superior spine of the ilium.

¹ See Appendix, note 439.

² Sometimes distinguished as the *true suspensory ligament of the penis*, or *deep part of the suspensory ligament of the penis*; in the author's nomenclature, however, the *false suspensory ligament of the penis*, or *superficial part of the suspensory ligament of the penis*, is designated *ligamentum fundiforme penis*. See note ² to p. 362, in Part III.

³ Sometimes distinguished as the *subcostal nerve*.

⁴ See note ¹ to p. 390, in Part III.

⁵ See Appendix to Part IV., note 68.

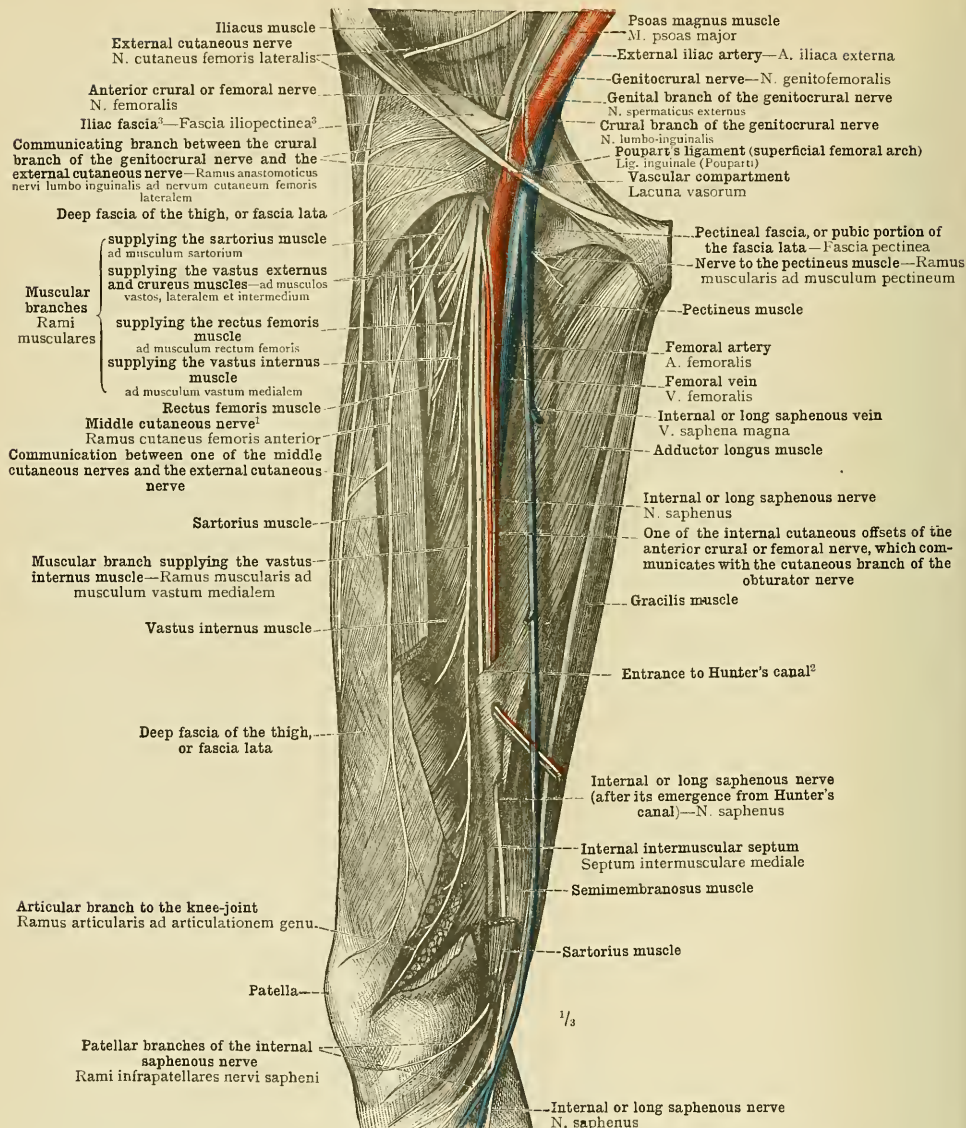


FIG. 1274.—THE DISTRIBUTION OF THE ANTERIOR CRURAL OR FEMORAL NERVE (N. FEMORALIS) ON THE FRONT OF THE THIGH, DISPLAYED BY THE PARTIAL REMOVAL OF THE SARTORIUS MUSCLE; THE ARTICULAR BRANCH TO THE KNEE-JOINT WAS EXPOSED BY MEANS OF AN INCISION IN THE VASTUS INTERNUS MUSCLE.

¹ See Appendix, note 439.

² According to English anatomists, the upper aperture of Hunter's canal (canalis adductorius Hunteri) is not at the point here shown, but much higher up in the thigh, at the apex of Scarpa's triangle. See Appendix to Part V., note 228.

³ See Note ¹ to p. 330, in Part III.

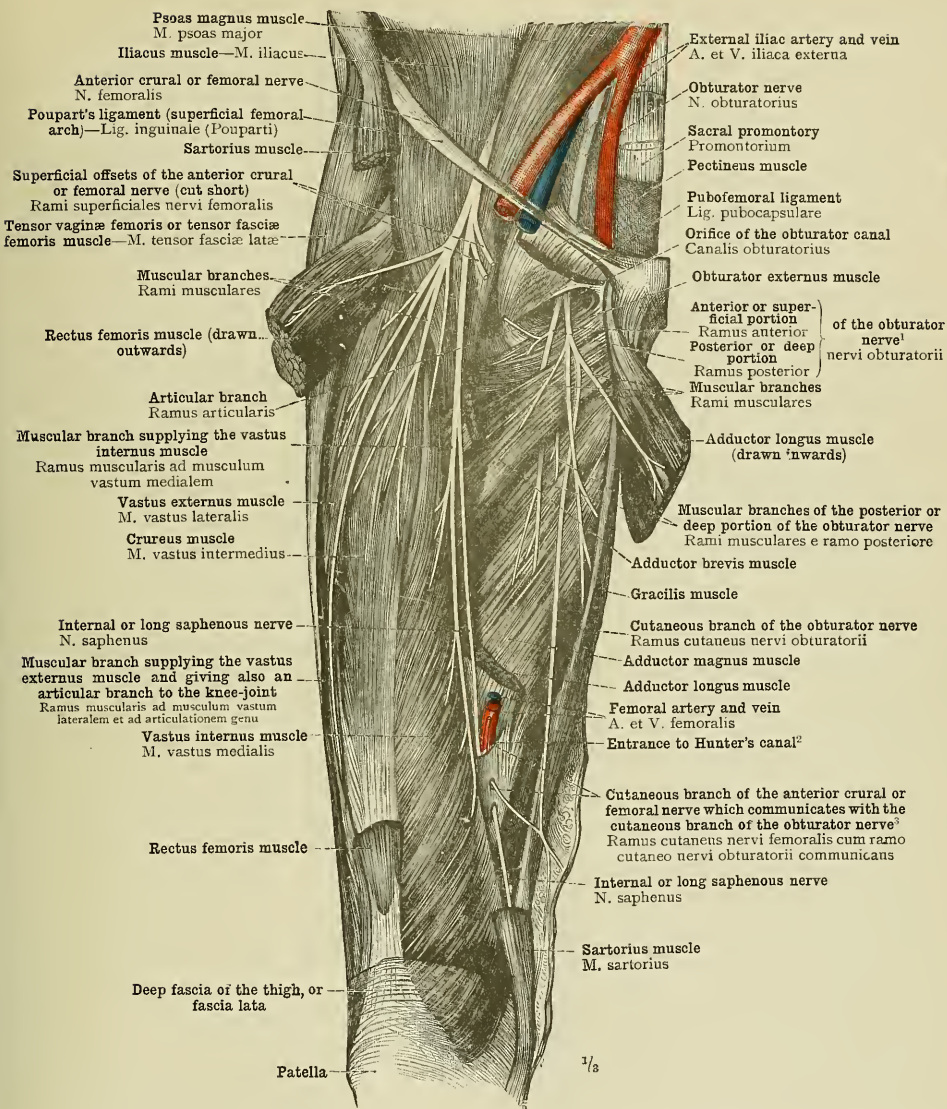
¹ See Appendix, note 440.² See note ² to p. 838.³ See Appendix, note 441.

FIG. 1275.—THE DISTRIBUTION OF THE ANTERIOR CRURAL OR FEMORAL NERVE (NERVUS FEMORALIS) AND THE OBTURATOR NERVE (NERVUS OBTURATORIUS), DISPLAYED FROM BEFORE BY THE PARTIAL REMOVAL OF THE SARTORIUS, RECTUS FEMORIS, ADDUCTOR LONGUS, AND PECTINEUS MUSCLES.

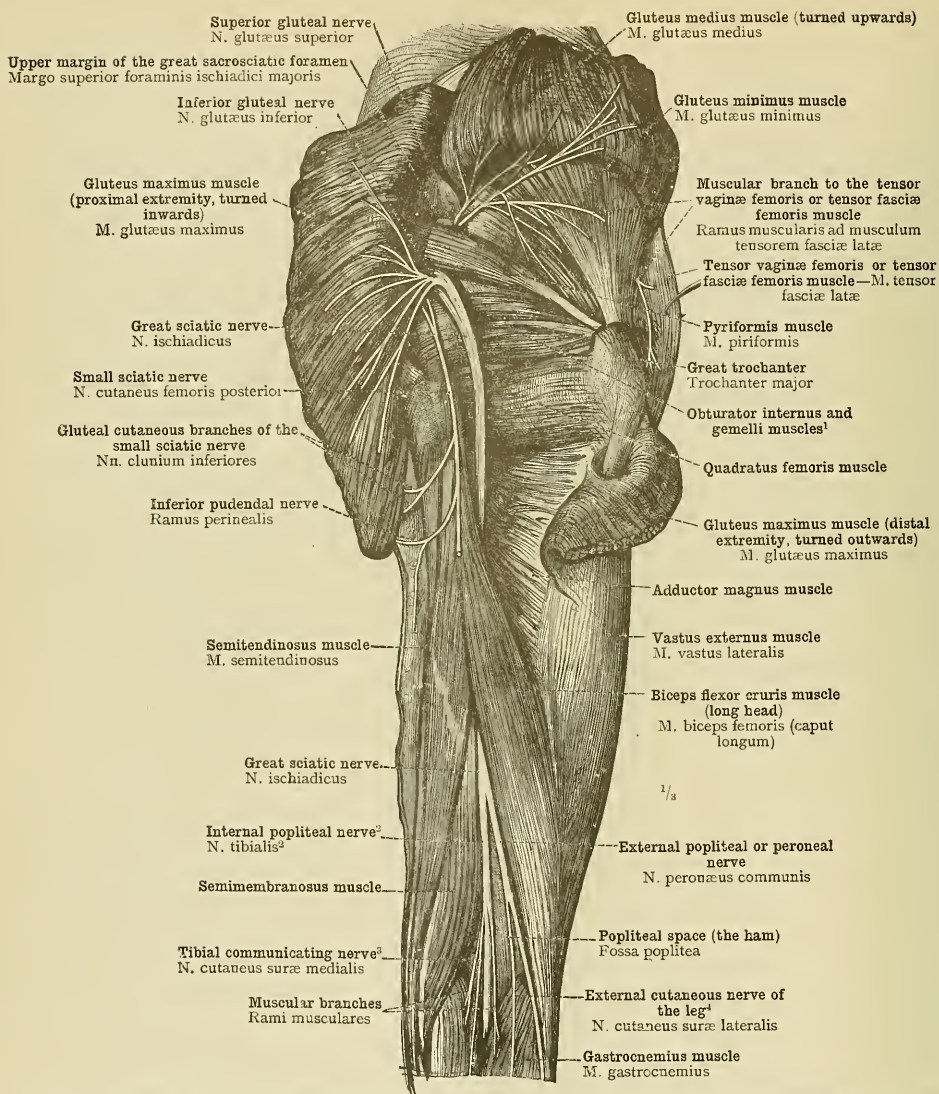


FIG. 1276.—THE SUPERIOR AND INFERIOR GLUTEAL NERVES, NN. GLUTEI SUPERIOR ET INFERIOR, AND THEIR BRANCHES TO THE THREE GLUTEAL MUSCLES AND TO THE TENSOR VAGINAE FEMORIS OR TENSOR FASCIAE FEMORIS MUSCLE, M. TENSOR FASCIAE LATAE. THE COURSE OF THE GREAT SCIATIC NERVE, N. ISCHIADICUS, FROM THE GLUTEAL REGION DOWN THE BACK OF THE THIGH, AND ITS DIVISION INTO THE INTERNAL POPLITEAL NERVE (see *Appendix, note* ⁴¹²), N. TIBIALIS, AND THE EXTERNAL POPLITEAL OR PERONEAL NERVE, N. PERONEUS COMMUNIS.

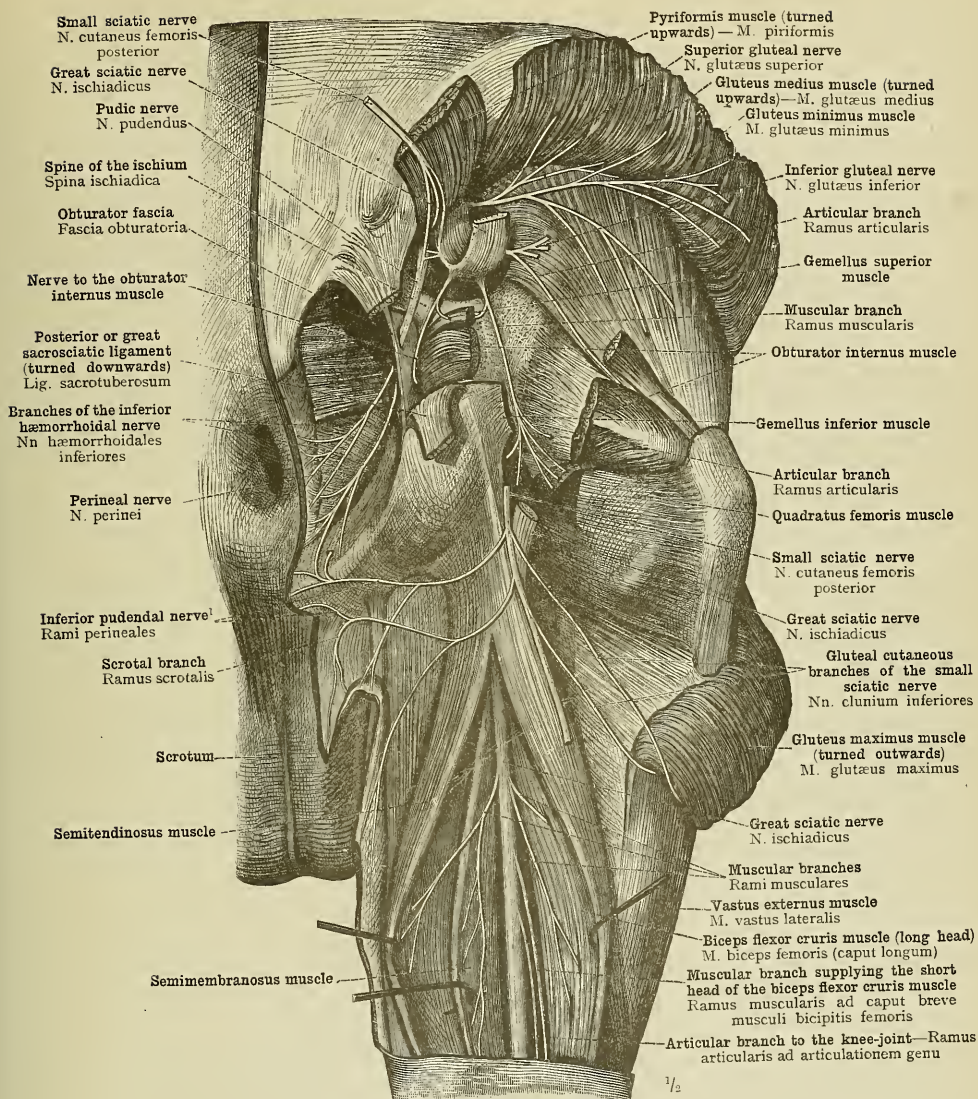
The gluteus maximus and gluteus medius muscles have been cut across, the segments of the former muscle having been turned inwards and outwards, respectively, while the latter muscle, which was divided close to its insertion, has been turned upwards.

¹ See note ¹ to p. 340, in Part III.

² See *Appendix, note* 442.

³ Sometimes known in England as the *communicans tibialis nerve*.

⁴ Quain calls this nerve the *lateral cutaneous nerve of the leg*, but gives no reason for departing from his ordinary usage of the word *external* to describe the relation in question.



¹ See Appendix, note 443.

FIG. 1277.—THE NERVES SUPPLYING THE DEEP MUSCLES OF THE GLUTEAL REGION AND THE SKIN OF THE PERINEAL REGION. THE COURSE OF THE PUDIC NERVE, N. PUDENDUS, OVER THE SPINE OF THE ISCHIUM, SPINA ISCHIADICA, AND THROUGH THE OBTURATOR FASCIA INTO THE ISCHIORECTAL FOSSA.

The great and small sciatic nerves (nervus ischiadicus et nervus cutaneus femoris posterior) have been cut across and their proximal portions turned upwards. The posterior or great sacrosclatic ligament, ligamentum sacrotuberosum, has been cut across, and detached from the obturator fascia.

The Deep Nerves of the Hip and the Thigh.

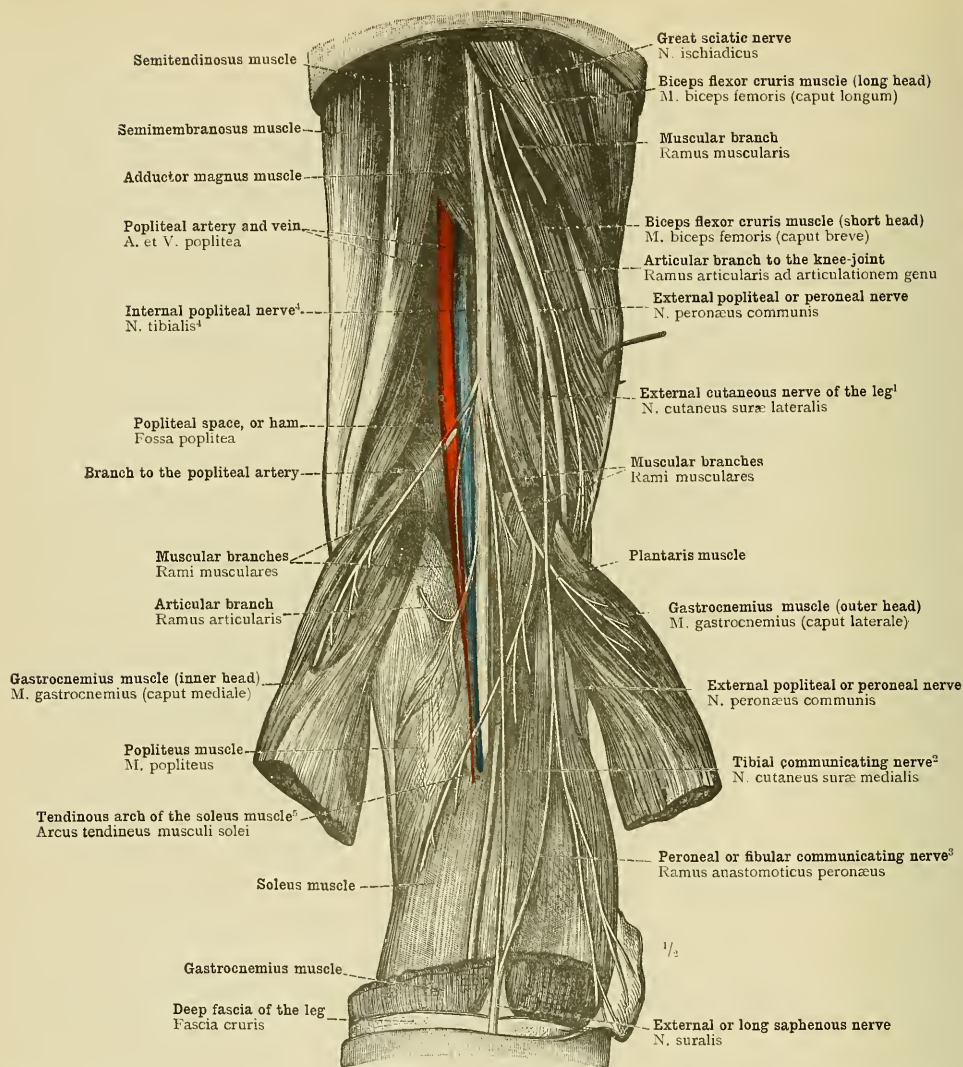


FIG. 1278.—DIVISION OF THE GREAT SCIATIC NERVE, N. ISCHIADICUS, INTO THE INTERNAL POPLITEAL NERVE, N. TIBIALIS (see *Appendix, note* ⁴₂), AND THE EXTERNAL POPLITEAL OR PERONEAL NERVE, N. PERONÆUS COMMUNIS. THE RELATIONS OF THE INTERNAL POPLITEAL NERVE TO THE POPLITEAL ARTERY AND VEIN, AND THE RELATIONS ALSO TO THESE VESSELS OF THE MUSCULAR BRANCHES GIVEN OFF IN THE POPLITEAL SPACE. THE EXTERNAL CUTANEOUS NERVE OF THE LEG, N. CUTANEUS SURÆ LATERALIS, GIVES OFF THE PERONEAL OR FIBULAR COMMUNICATING NERVE, RAMUS ANASTOMOTICUS PERONÆUS; FROM THE INTERNAL POPLITEAL NERVE IS DERIVED THE TIBIAL COMMUNICATING NERVE, N. CUTANEUS SURÆ MEDIALIS; THESE TWO COMMUNICATING NERVES UNITE, IN THIS SPECIMEN NEAR THE TOP OF THE CALF, TO FORM THE EXTERNAL SAPHENOUS NERVE, N. SURALIS.

The heads of the gastrocnemius muscle have been cut across and turned inwards and outwards respectively, thus exposing the popliteus, soleus, and plantaris muscles, as well as the tendon of the last-named muscle.

¹ See note 4 to p. 840.

² Sometimes known in England as the *communicans tibialis* nerve.

³ Sometimes known in England as the *communicans fibularis* nerve.

⁴ See *Appendix, note* ⁴₂.

⁵ See note 7 to p. 363, in Part III.

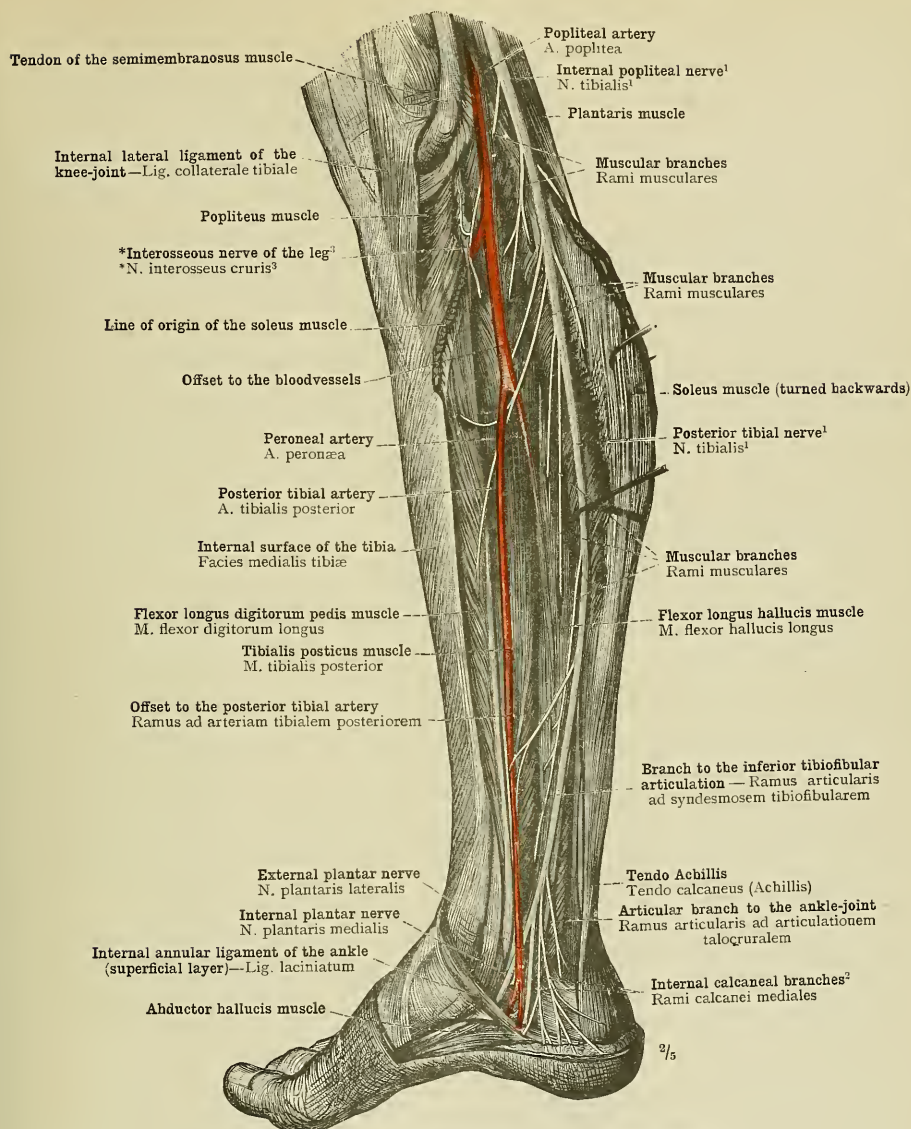
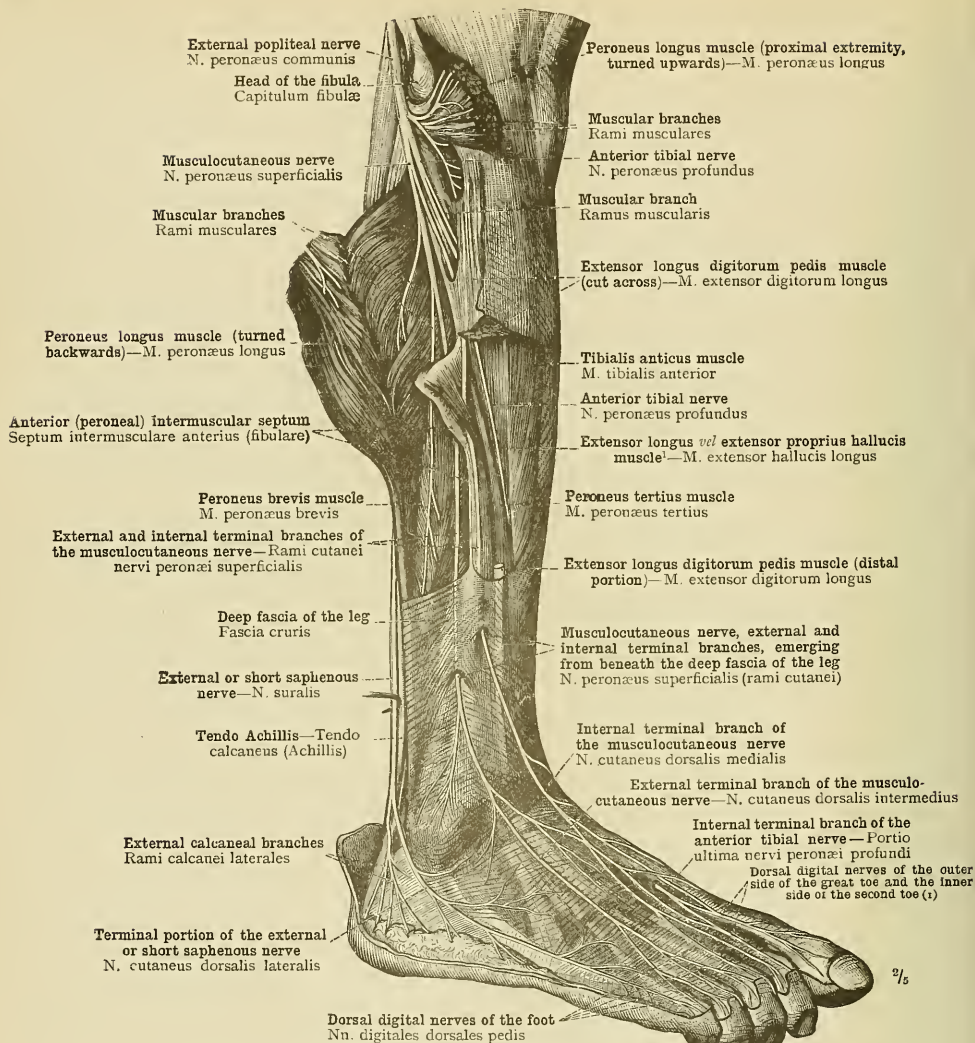
¹ See Appendix, note 442.² See Appendix, note 444.³ See Appendix, note 445.

FIG. 1279.—THE BRANCHES OF THE INTERNAL POPLITEAL NERVE (N. TIBIALIS) AND ITS CONTINUATION, THE POSTERIOR TIBIAL NERVE (N. TIBIALIS—see Appendix, note 442), TO THE DEEP MUSCLES OF THE BACK OF THE LEG AND TO THE SKIN OF THE CALCANEAL REGION; THE DIVISION OF THE POSTERIOR TIBIAL NERVE INTO THE EXTERNAL AND INTERNAL PLANTAR NERVES (NN. PLANTARES, LATERALIS ET MEDIALIS). SEEN FROM THE INNER SIDE.

The soleus muscle has been detached from its tibial origin and turned backwards.

Nerves of the Leg.



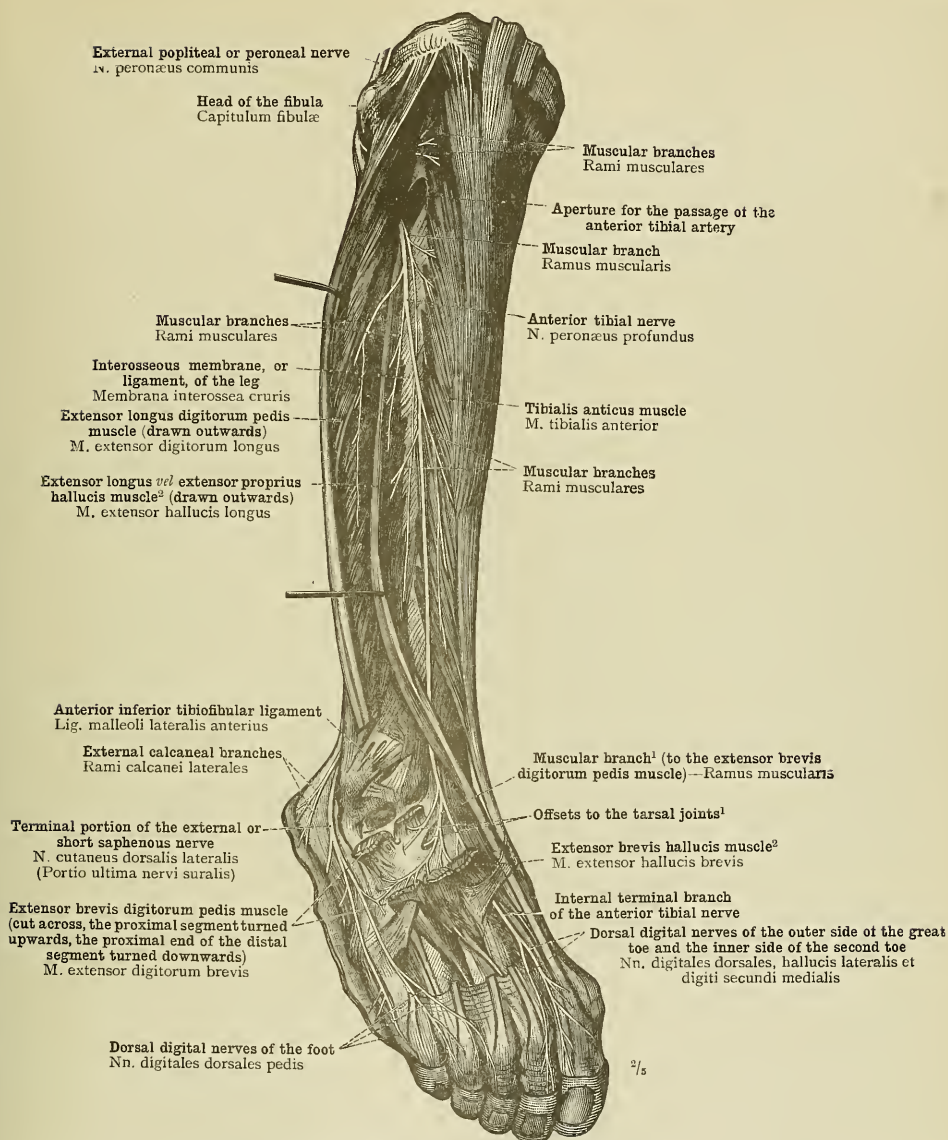
(†) Nn. digitales dorsales, hallucis lateralis et digiti II. medialis

† See note 2 to p. 364, in Part III.

FIG. 1280.—THE DISTRIBUTION OF THE EXTERNAL POPLITEAL OR PERONEAL NERVE, ITS BRANCHES TO THE PERONEUS LONGUS AND PERONEUS BREVIS MUSCLES, AND ITS CUTANEOUS BRANCH TO THE DORSUM OF THE FOOT, THE MUSCULOCUTANEOUS NERVE, N. PERONÆUS SUPERFICIALIS, WHICH DIVIDES (IN THIS SPECIMEN) A LITTLE BELOW THE KNEE INTO EXTERNAL AND INTERNAL TERMINAL BRANCHES, NN. CUTANEI DORSALES, MEDIALIS ET INTERMEDIUS. THE DISTRIBUTION OF THESE TWO CUTANEOUS NERVES AND OF THE EXTERNAL OR SHORT SAPHENOUS NERVE, N. SURALIS, THE TERMINAL PORTION OF WHICH (AS THE N. CUTANEUS DORSALIS LATERALIS) SUPPLIES THE SKIN OF THE OUTER SIDE OF THE DORSUM OF THE FOOT. THE INTERNAL TERMINAL BRANCH OF THE ANTERIOR TIBIAL NERVE, SUPPLYING THE ADJACENT SIDES OF THE FIRST AND SECOND TOES, IS ALSO SEEN. VIEWED FROM THE OUTER SIDE.

The peroneus longus muscle has been incised above, and the margins of the incision have been well separated.

Nerves of the Leg and Foot.



¹ See Appendix, note 446.

² See note ² to p. 364, in Part III.

FIG. 1281.—THE ANTERIOR TIBIAL NERVE, N. PERONÆUS PROFUNDUS, AND ITS DISTRIBUTION TO THE MUSCLES OF THE FRONT OF THE LEG AND THE DORSUM OF THE FOOT. THE DISTRIBUTION ON THE FOOT OF THE TERMINAL PORTION OF THE EXTERNAL OR SHORT SAPHENOUS NERVE; IN THIS SPECIMEN THE CUTANEOUS AREA OF THIS NERVE EXTENDS TO THE FOURTH AND THIRD TOES, WHEREAS IN THE SPECIMEN DEPICTED IN FIG. 1280 THIS AREA IS LIMITED TO THE OUTER SIDE OF THE LITTLE TOE.

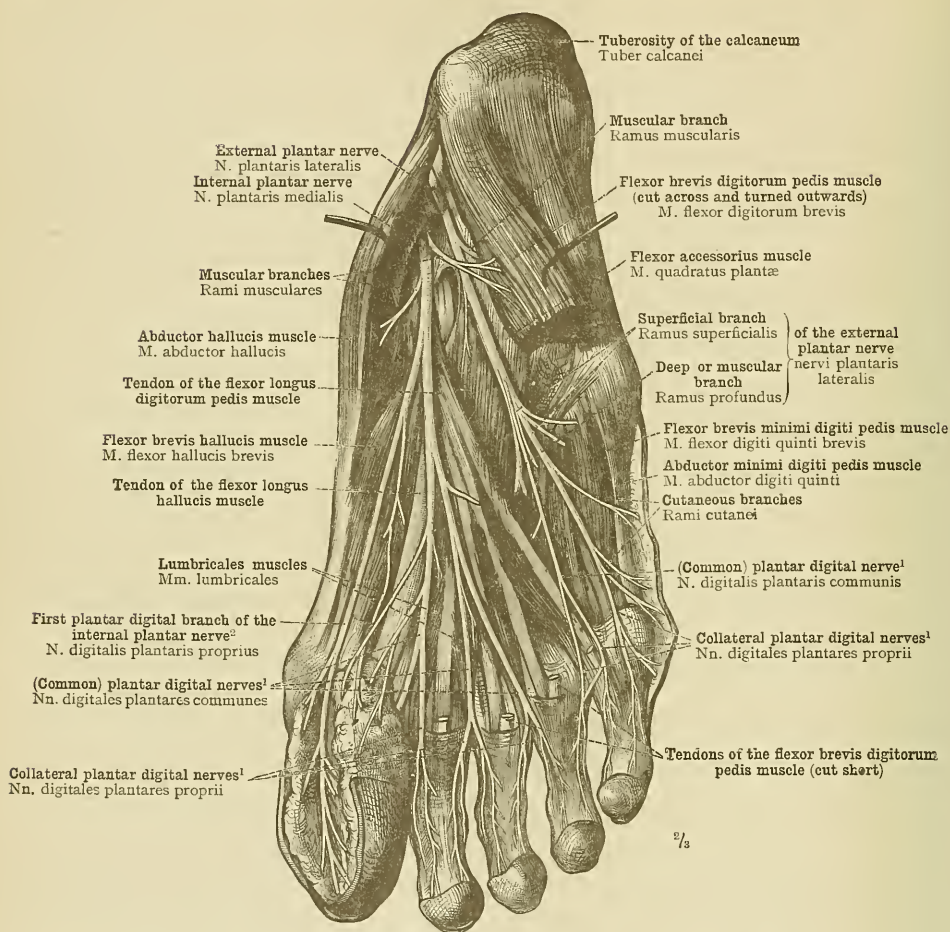


FIG. 1282.—THE DEEP NERVES OF THE SOLE OF THE FOOT, DISPLAYED BY THE PARTIAL REMOVAL OF THE PLANTAR FASCIA, APONEUROSIS PLANTARIS, AND OF THE FLEXOR BREVIS DIGITORUM PEDIS MUSCLE. THE PROXIMAL HALF OF THE ABDUCTOR HALLUCIS MUSCLE HAS BEEN DRAWN OUTWARDS, IN ORDER TO EXPOSE THE ENTRANCE OF THE EXTERNAL AND INTERNAL PLANTAR NERVES, NERVI PLANTARES, LATERALIS ET MEDIALIS, INTO THE SOLE OF THE FOOT.

¹ *Plantar Digital Nerves*.—As in the case of the *palmar* digital nerves, the author distinguishes between the *nervi digitales plantares communes*, common plantar digital nerves (before division), and the *nervi digitales plantares proprii*, collateral plantar digital nerves (after division). The distinction is often ignored in the English nomenclature.

² This branch (in common with which arises the nerve to the *flexor brevis hallucis* muscle) supplies the skin of the inner half of the plantar surface of the great toe. Strictly speaking it is one of the *collateral plantar digital branches* (see note ¹ above)—*N. digitalis plantaris proprius* in the author's nomenclature.

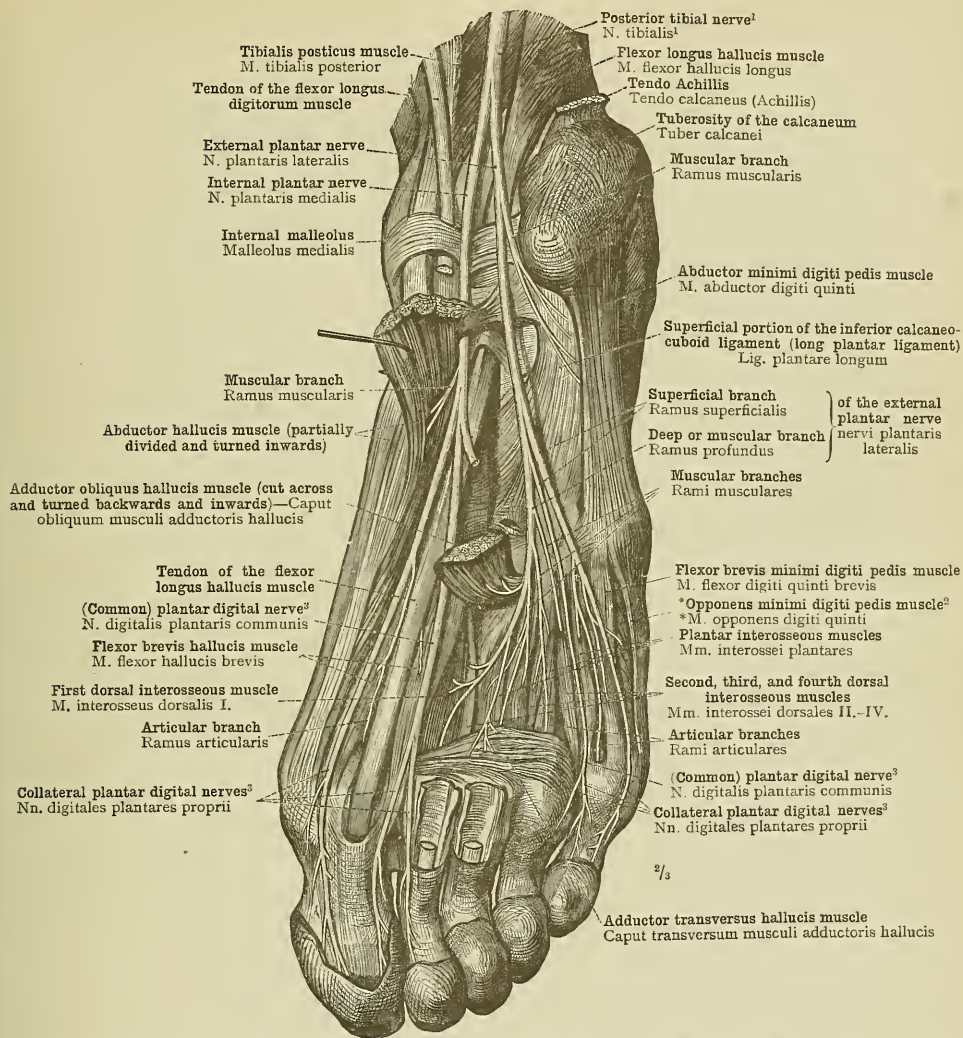
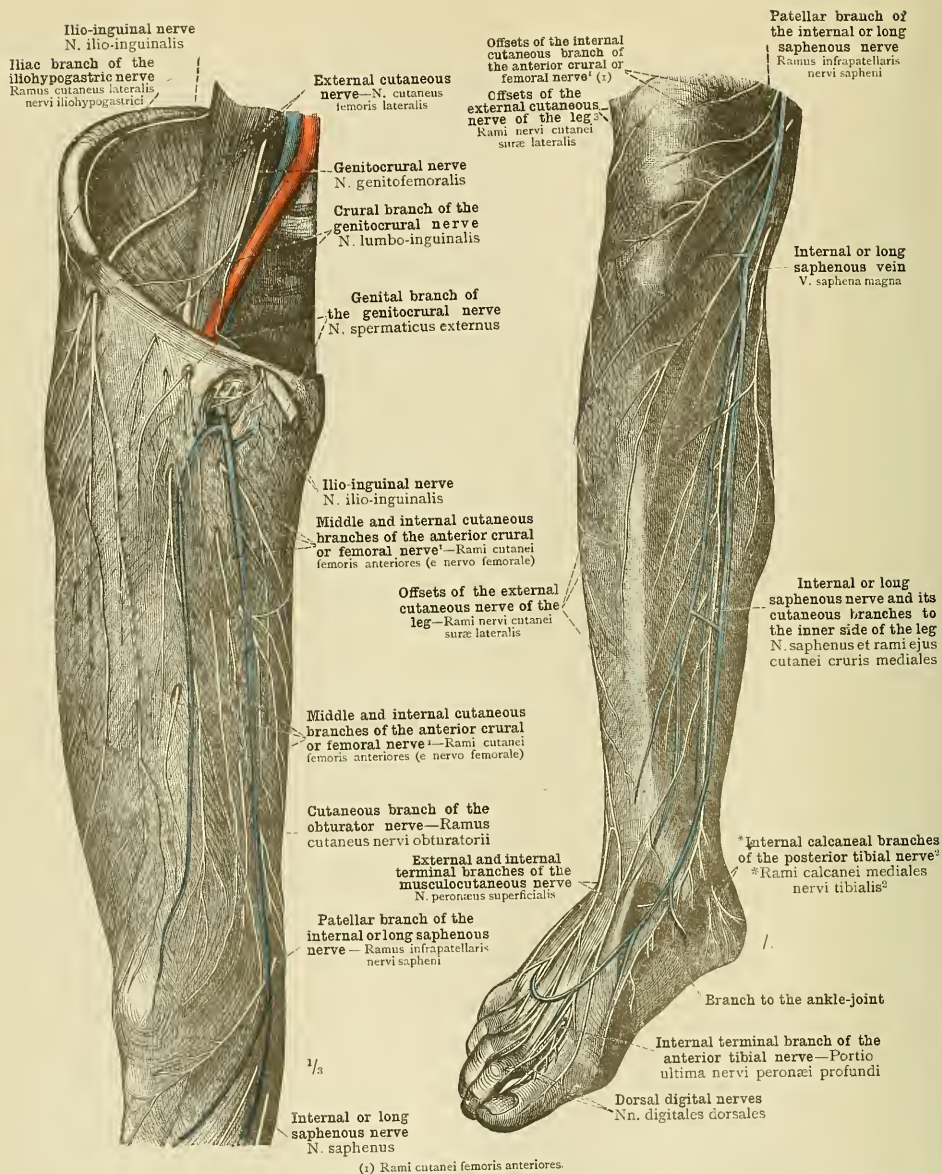
¹ See Appendix, note 442.² See note 3 to p. 364, in Part III.³ See note 1 to p. 846.

FIG. 1283.—THE DEEP OR MUSCULAR BRANCH OF THE EXTERNAL PLANTAR NERVE, RAMUS PROFUNDUS NERVI PLANTARIS LATERALIS, AND ITS DISTRIBUTION TO THE DEEP MUSCLES OF THE SOLE OF THE FOOT, DISPLAYED BY THE REMOVAL OF THE LONG AND THE SHORT FLEXORS OF THE TOES, AND BY DRAWING ASIDE THE ADDUCTOR OBLIQUUS HALLUCIS MUSCLE, CAPUT OBLIQUUM MUSCULI ADDUCTORIS HALLUCIS. THE PASSAGE OF THE EXTERNAL AND INTERNAL PLANTAR NERVES, NERVI PLANTARES, MEDIALIS ET LATERALIS, INTO THE SOLE OF THE FOOT HAS BEEN EXPOSED BY CUTTING THROUGH THE SUPERFICIAL LAYERS OF THE INTERNAL ANNULAR LIGAMENT OF THE ANKLE (LIGAMENTUM LACINIATUM) AND THE ABDUCTOR HALLUCIS MUSCLE.



(r) Rami cutanei femoris anteriores.

FIG. 1284.—THE CUTANEOUS NERVES OF THE FRONT AND THE INNER SIDE OF THE THIGH.

FIG. 1285.—THE CUTANEOUS NERVES OF THE INNER SIDE AND THE FRONT OF THE LEG AND OF THE INNER SIDE AND THE DORSUM OF THE FOOT.

¹ See Appendix, note 439.² See Appendix, note 444.³ See note ⁴ to p. 840.

Cutaneous offsets of the external branches of the posterior primary divisions of the sacral nerves
Nn. clunium medii

Cutaneous offsets of the external branches of the posterior primary divisions of the first, second, and third lumbar nerves
Nn. clunium superiores

Branches of the inferior pudendal nerve⁵
Rami perineales

Femoral cutaneous branches of the small sciatic nerve
Rami nervi cutanei femoris posterioris

Cutaneous branch of the obturator nerve
Ramus cutaneus nervi obturatorii

Cutaneous branch of the internal or long saphenous nerve to the inner side of the leg
Ramus cutaneus cruris medialis nervi sapheni

Internal popliteal nerve¹—N. tibialis⁴

Small sciatic nerve
N. cutaneus femoris posterior

Cutaneous branch of the internal or long saphenous nerve to inner side of the leg
Ramus cutaneus cruris medialis nervi sapheni

Offsets of the external cutaneous nerve
Rami nervi cutanei femoris lateralis

Gluteal cutaneous branches of the small sciatic nerve
Nn. clunium inferiores

Small sciatic nerve (seen through the fascia lata)
N. cutaneus femoris posterior

Offsets of the external cutaneous nerve (of the thigh)
Rami nervi cutanei femoris lateralis

Offsets of the external cutaneous nerve of the leg—Rami nervi cutanei surae lateralis

External calcaneal branches—Rami calcanei laterales

External popliteal or peroneal nerve
N. peroneus communis

Tibial communicating nerve¹—N. cutaneus surae medialis

External cutaneous nerve of the leg²
N. cutaneus surae lateralis

External or short saphenous vein
V. saphena parva

Tibial communicating nerve¹ (seen through the deep fascia)
N. cutaneus surae medialis

Tibial communicating nerve¹—N. cutaneus surae medialis

Peroneal or fibular communicating nerve³
Ramus anastomoticus peroneus

External or short saphenous nerve
N. suralis

Terminal portion of the external or short saphenous nerve
N. cutaneus dorsalis lateralis

FIG. 1286.—THE CUTANEOUS NERVES OF THE GLUTEAL REGION AND THE BACK OF THE THIGH.

FIG. 1287.—THE CUTANEOUS NERVES OF THE BACK OF THE LEG.

¹ Sometimes known in England by the name *communicans tibialis* nerve.

³ Sometimes known in England as the *communicans fibularis* nerve.

² See plate ⁴ to p. 840.

⁴ See Appendix, note 442.

⁵ See Appendix, note 443.

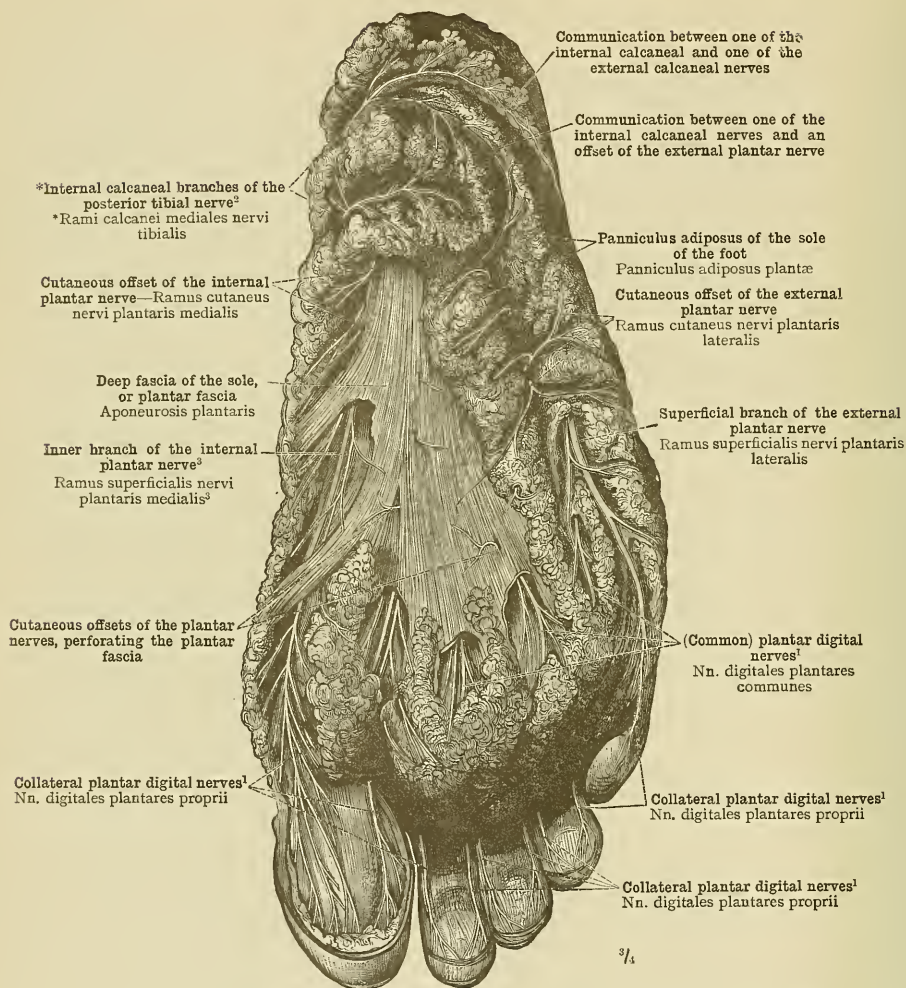


FIG. 1288.—THE CUTANEOUS NERVES OF THE SOLE OF THE FOOT, THE SKIN HAVING BEEN REMOVED, BUT THE SUPERFICIAL FASCIA (PANNICULUS ADIPOSUS) IN PART PRESERVED.

¹ See note 1 to p. 846.

² See Appendix, note 444.

³ *Inner Branch of the Internal Plantar Nerve*.—In the original German edition of this work the author, in the letterpress to Fig. 1288, calls this "Oberflächlicher Ast des N. plantaris medialis," the superficial branch of the internal plantar nerve. In the German official nomenclature, however, this nerve is not, like the external plantar nerve, said to divide into a *ramus superficialis* and a *ramus profundus*. Quain calls the branch in question the *first digital branch of the internal plantar nerve*, "destined for the inner side of the great toe; it becomes subcutaneous further back than the others, and sends off a branch to the flexor brevis hallucis muscle" (Quain, *op. cit.*, vol. iii, part ii, p. 333). But in the description of Fig. 217, on the next page to that just quoted, Quain calls this nerve "the inner branch of the internal plantar nerve, giving branches to the flexor brevis hallucis muscle, and forming the internal collateral nerve of the great toe." The second of the two names used by Quain is that which I have adopted in the text.

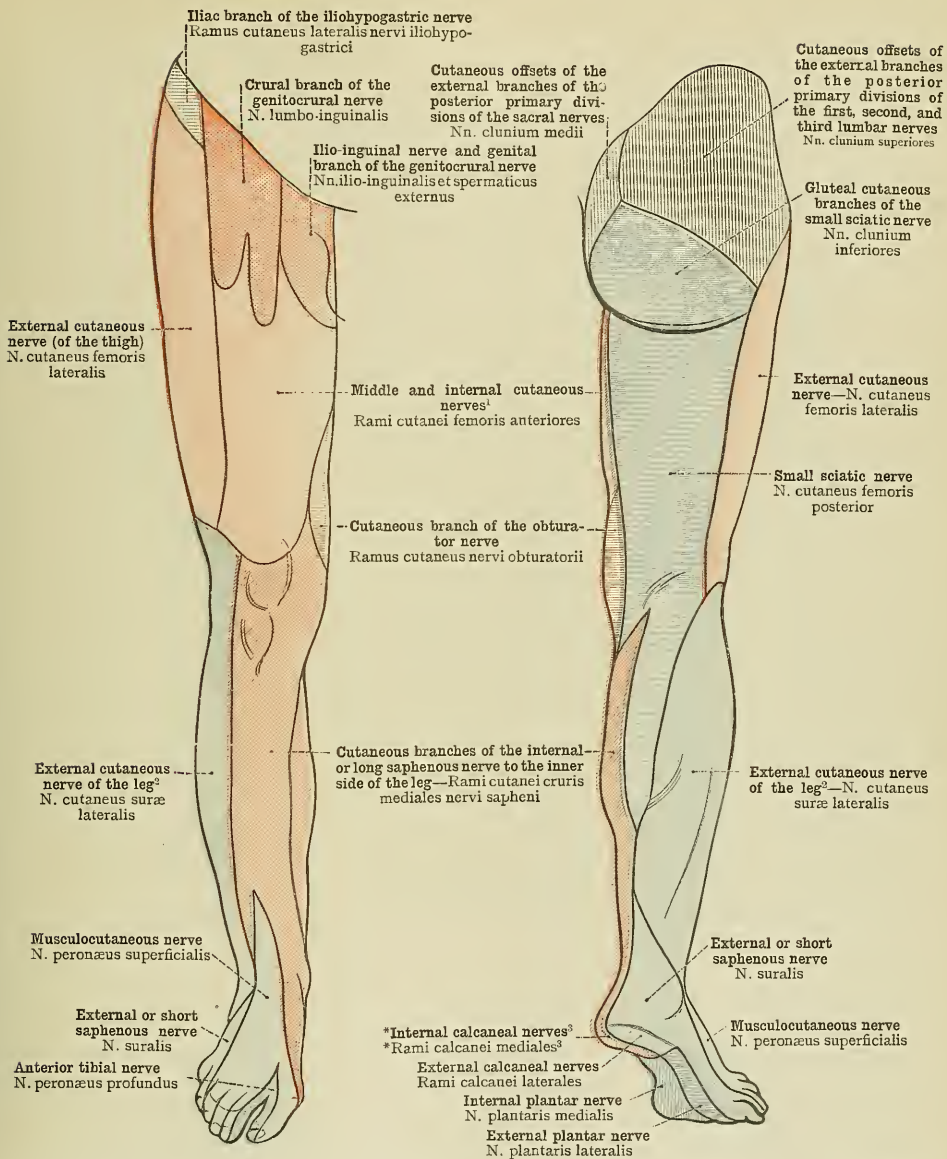


FIG. 1289.—THE CUTANEOUS AREAS OF THE NERVES OF THE LOWER EXTREMITY. ANTERIOR SURFACE.

FIG. 1290.—THE CUTANEOUS AREAS OF THE NERVES OF THE LOWER EXTREMITY. POSTERIOR SURFACE.

¹ See Appendix, note 439.² See note 4 to p. 840.³ Calcaneoplantar nerve, according to Quain. See Appendix, note 444.

Cutaneous Nerves of the Lower Extremity.

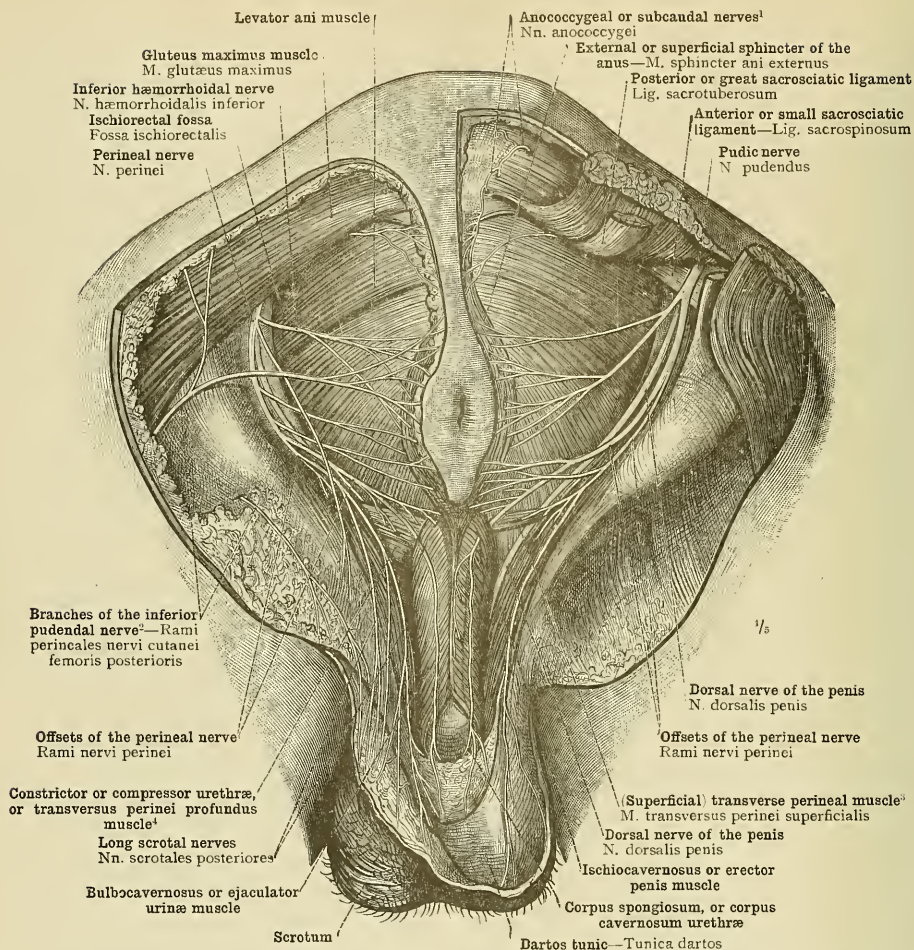
¹ See Appendix, note 439.² See Appendix, note 433.³ See note ¹ to p. 527, in Part IV.⁴ See Appendix to Part IV., note 107.

FIG. 1291.—THE DISTRIBUTION OF THE PUDIC NERVE, N. PUDENDUS, IN THE PERINEAL REGION OF THE MALE AND ON THE BACK OF THE SCROTUM. THE COURSE OF THE DORSAL NERVE OF THE PENIS, N. DORSALIS PENIS, IN THE OUTER WALL OF THE ISCHIORECTAL FOSSA, FOSSA ISCHIORECTALIS. THE ANOCOCCYGEAL OR SUBCAUDAL NERVES, NN. ANOCOCCYGEI (see Appendix, note ⁴³⁸). ON THE LEFT SIDE OF THE BODY THE BRANCHES OF THE INFERIOR PUDENDAL NERVE, RAMI PERINEALES NERVI CUTANEI FEMORIS POSTERIORIS (see Appendix, note ⁴⁴³), HAVE BEEN DISSECTED OUT. ONE OF THESE BRANCHES IS UNUSUALLY LARGE IN THIS SPECIMEN, AND SUPPLIES THE SKIN OF THE ANAL REGION (VAR.).

On the right side of the body the hinder portion of the gluteus maximus muscle and the posterior or great sacrospinous ligament (ligamentum sacrotuberosum) have been divided, in order to display the entrance of the pudic nerve (n. pudendus) into the ischiorectal fossa. On the same side the urogenital diaphragm (see Appendix to Part IV., note ⁹⁹) has been removed, but the (superficial) transverse perineal muscle (see note ¹ to p. 527, in Part IV.) has been left intact. The trunk of the internal pudic nerve (n. pudendus) and the primary branches of that nerve, in so far as they run within the substance of the obturator fascia, have been dissected out of that fascia.

Nerves of the Male Perineal Region.

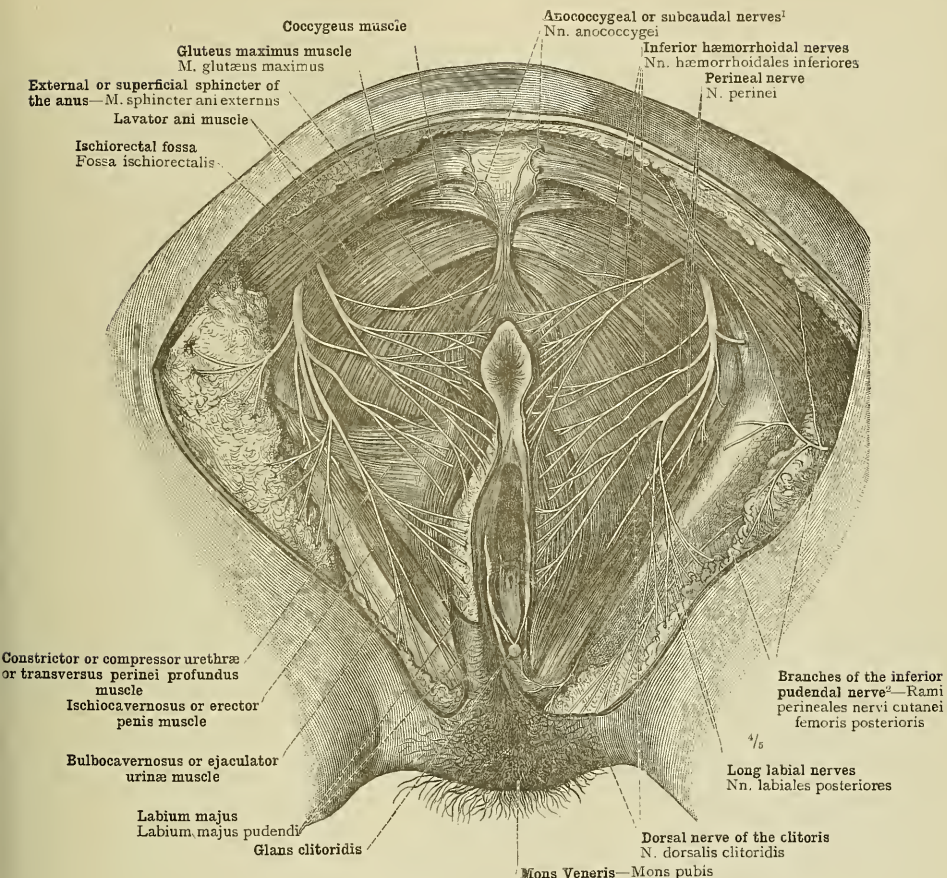
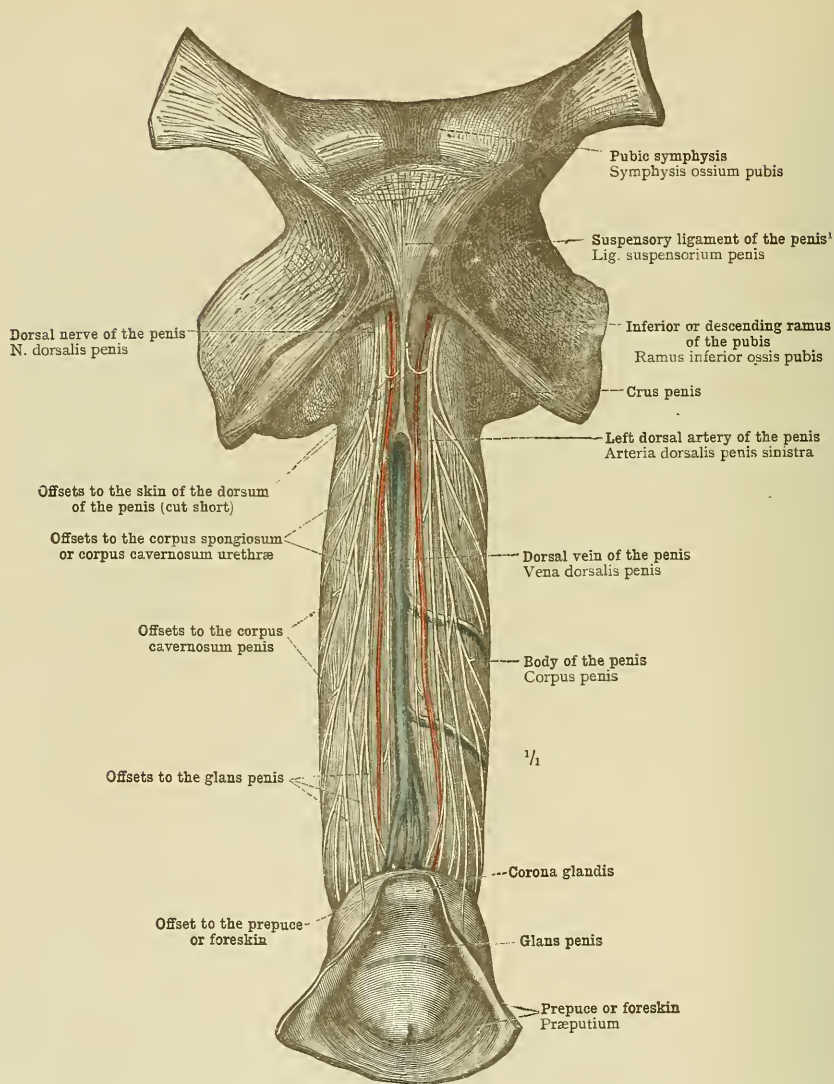
¹ See Appendix, note 438.² See Appendix, note 443.

FIG. 1292.—THE DISTRIBUTION OF THE PUDIC NERVE, N. PUDENDUS, IN THE FEMALE PERINEAL AND PUBIC REGIONS. THE TRUNK OF THE PUDIC NERVE, N. PUDENDUS, IS COVERED BY THE GLUTEUS MAXIMUS MUSCLE. ON THE RIGHT SIDE OF THE BODY THE BRANCHES OF THE INFERIOR PUDENDAL NERVE, RAMI PERINEALES, NERVI CUTANEI FEMORIS POSTERIORIS (see Appendix, note 443), HAVE BEEN DISSECTED OUT; BUT THE BRANCHES OF THIS NERVE TO THE LABIUM MAJUS HAVE BEEN CUT SHORT. THE FORMATION OF THE ANOCOCYGEAL OR SUBCAUDAL NERVES, NN. ANOCOCYGEI (see Appendix, note 438), OUT OF THE POSTERIOR PRIMARY DIVISION OF THE COCCYGEAL NERVE AND OUT OF PERFORATING BRANCHES WHICH ARISE FROM THE ANTERIOR PRIMARY DIVISIONS OF THE FOURTH AND FIFTH SACRAL NERVES AND THE COCCYGEAL NERVE. IN THIS CONNEXION SEE ALSO FIG. 1295.

On the right side of the body the urogenital diaphragm (see Appendix to Part IV., note 99) and the labium majus have been entirely removed, whereas on the left side the skin has only been in part dissected off the labium majus, and the constrictor or compressor urethrae or transversus perinei profundus (see Appendix to Part IV., note 101) muscle has been left intact.

Nerves of the Female Perineal Region.



¹ This ligament is in England commonly distinguished as the *true suspensory ligament of the penis*. See note ² to p. 382, in Part III.—Tr.

FIG. 1293.—THE DISTRIBUTION OF THE DORSAL NERVE OF THE PENIS, N. DORSALIS PENIS, ON THE DORSUM OF THE PENIS, AND THE RELATION OF THE DORSAL ARTERY AND VEIN OF THE PENIS TO THE OFFSETS OF THE DORSAL NERVE OF THE PENIS.

The skin of the penis has been removed, with the exception of the prepuce or foreskin (præputium); an incision has been made through the dorsal portion of the latter, in the median line.

Nerves of the Penis.

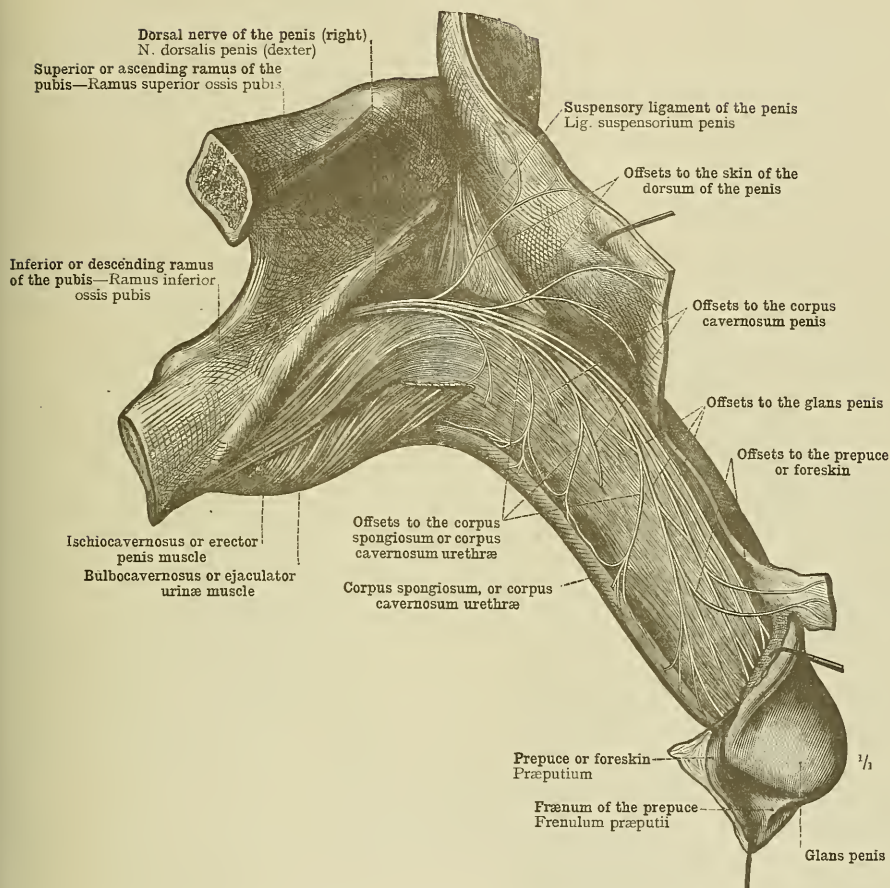
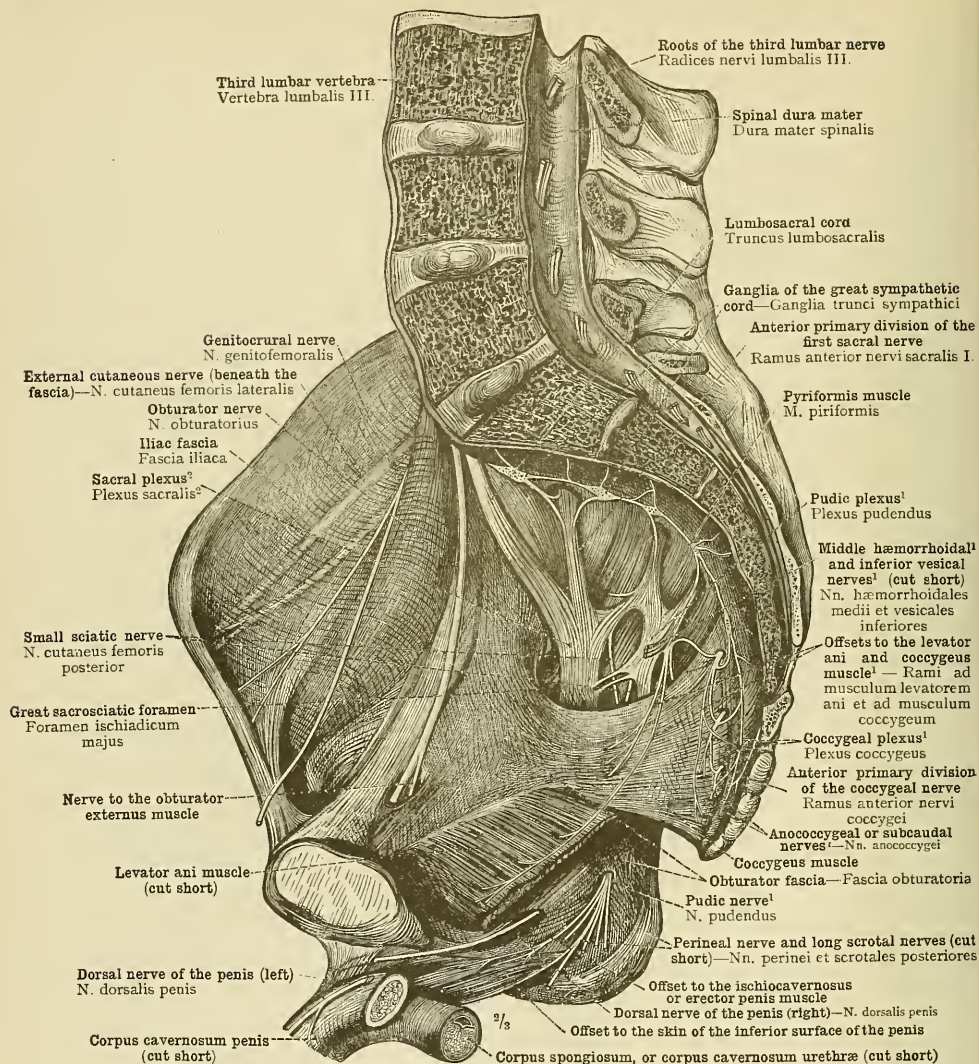


FIG. 1294.—THE DISTRIBUTION OF THE DORSAL NERVE OF THE PENIS IN THE SUBSTANCE OF THE PENIS AND THE SKIN OF THAT ORGAN. SEEN FROM THE RIGHT SIDE.

The preserved portion of the skin of the right side of the penis and the mons pubis has been drawn forwards. The anterior portion of the bulbocavernosus or erector penis muscle has been cut away, in order to expose to view the branch of the dorsal nerve of the penis that enters that muscle.



¹ See Appendix, note 438.

² The nervous plexus denoted here by the term *plexus sacralis* is by some English authors called the *sciatic plexus*, the *sacral plexus* of these authors comprising both the *plexus sacralis* and the *plexus pudendus* of Toldt. See Appendix, note 438.

FIG. 1295.—THE SACRAL PLEXUS, PLEXUS SACRALIS (see note ² above), THE PUDIC PLEXUS, PLEXUS PUDENDUS (see Appendix, note 438), AND THE COCCYGEAL PLEXUS, PLEXUS COCCYGEUS (see Appendix, note 438), AS SEEN IN THE RIGHT HALF OF A MALE PELVIS DIVIDED BY A MEDIAN SAGITTAL SECTION. THE NERVES TO THE LEVATOR ANI AND COCCYGEUS MUSCLES, DERIVED FROM THE THIRD AND FOURTH SACRAL NERVES (see Appendix, note 438). THE OFFSETS FROM THE ANTERIOR PRIMARY DIVISIONS OF THE COCCYGEAL NERVE AND THE FOURTH AND FIFTH SACRAL NERVES WHICH, AFTER RECEIVING A COMMUNICATING BRANCH FROM THE SYMPATHETIC NERVOUS SYSTEM, PERFORATE THE COCCYGEUS MUSCLE AND ASSIST IN FORMING THE ANO-COCCYGEAL OR SUBCAUDAL NERVES, NN. ANOCOCCYGEI. (IN THIS CONNEXION SEE ALSO FIG. 1292.) THE PASSAGE OF BRANCHES OF THE PUDIC NERVE, N. PUDENDUS, THROUGH THE OBTURATOR FASCIA INTO THE ISCHIORECTAL FOSSA.

The Sacral Plexus, Plexus Sacralis; the Pudic Plexus, Plexus Pudendus; and the Coccygeal Plexus, Plexus Coccygeus (see Appendix, note 438, and note ² above).

SYSTEMA NERVORUM
PERIPHERICUM

THE
PERIPHERAL NERVOUS SYSTEM

NERVI CEREBRALES

CRANIAL NERVES

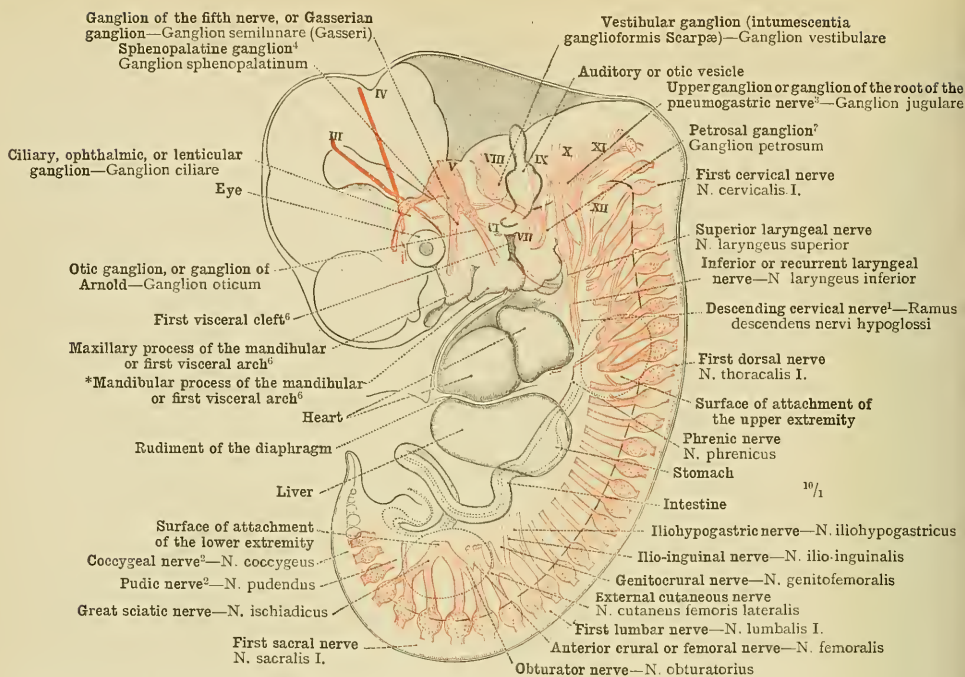


FIG. 1296.—RUDIMENT OF THE CEREBROSPINAL NERVOUS SYSTEM IN A HUMAN EMBRYO HAVING A BODY-LENGTH OF $\frac{3}{8}$ INCH (10.2 MILLIMETRES). ABOUT THE THIRTY-SECOND DAY OF INTRA-UTERINE LIFE. AFTER W. HIS.

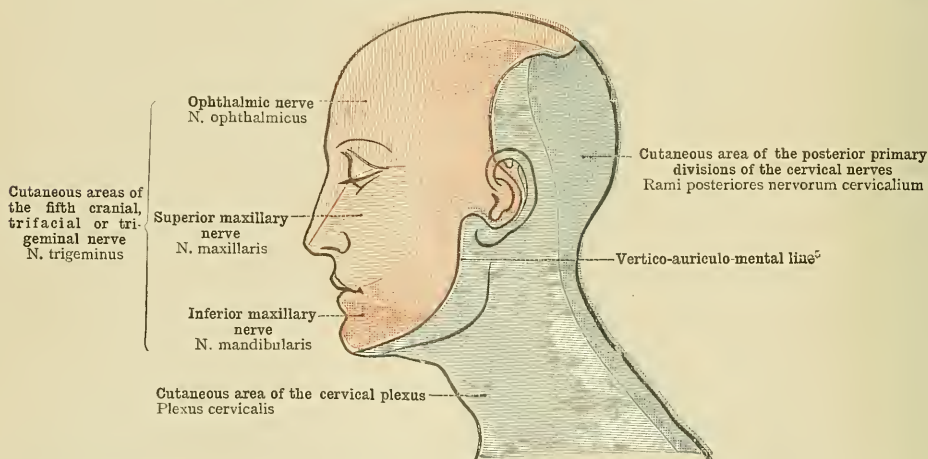


FIG. 1297.—THE CUTANEOUS AREAS OF THE FIFTH CRANIAL, TRIFACIAL, OR TRIGEMINAL NERVE, N. TRIGEMINUS, AND ITS THREE DIVISIONS.

* Often called the *descendens noni nerve*. See Appendix, note 420.

4 Known also as *Meckel's ganglion* and as the *nasal ganglion*.

7 Also known as *Andersch's ganglion*.

2 See Appendix, note 438.

5 See note 1 to p. 811.

3 See Appendix, note 447.

6 See Appendix, note 448.

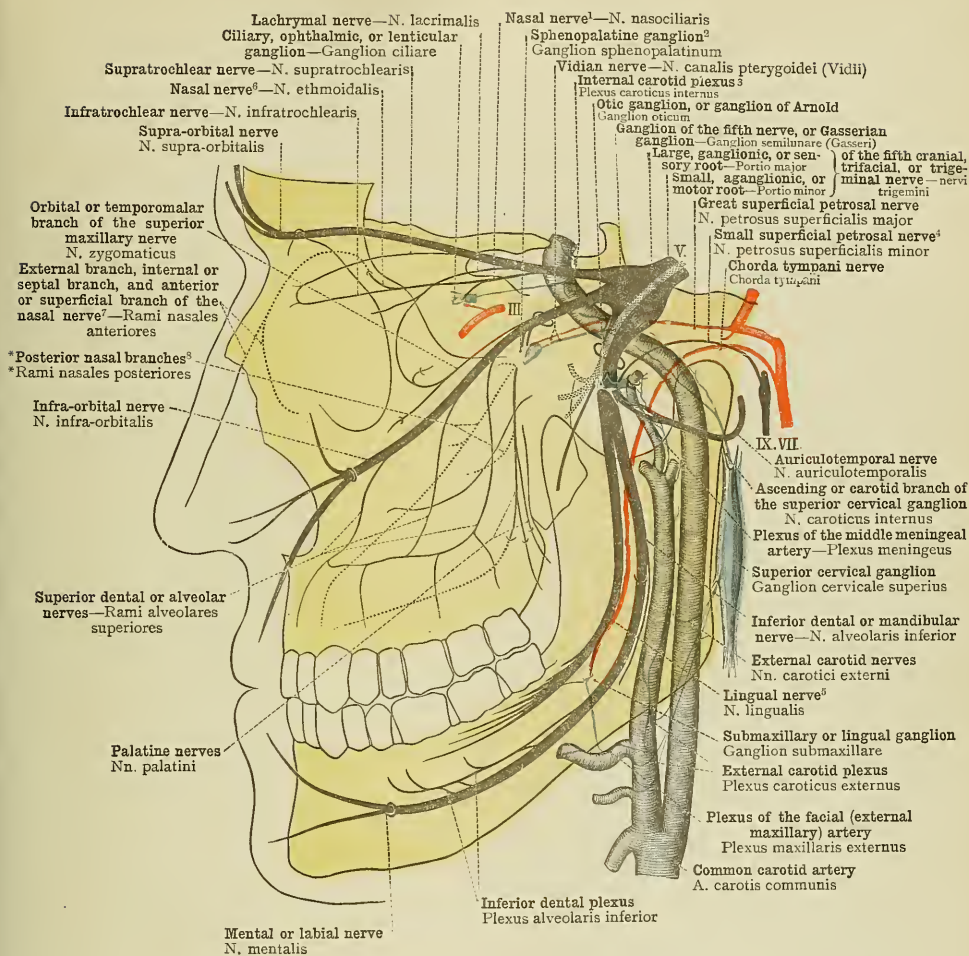


FIG. 1298.—THE FIFTH CRANIAL, TRIGEMINAL, OR TRIFACIAL NERVE, N. TRIGEMINUS; DIAGRAMMATIC REPRESENTATION OF ITS DISTRIBUTION AND OF ITS PRINCIPAL COMMUNICATIONS.

The nerves tinted red are the third cranial or common oculomotor nerve, nervus oculomotorius (III.), and the seventh cranial or facial nerve, nervus facialis (VII.); the Roman numeral V. indicates the roots of the trigeminal nerve, the numeral IX. indicates the glossopharyngeal nerve. The ganglia connected with the trigeminal nerve are tinted blue; blue also are those parts of the sympathetic nervous system that appear in the figure.

¹ Known also as the *oculonasal* and as the *nasociliary* nerve.

² Known also as *Meckel's ganglion* and as the *nasal ganglion*.

³ *Carotid Plexus*.—In England the plexus of nerves surrounding the internal carotid artery is often spoken of as the *carotid plexus* without qualification.

⁴ By Arnold called the *long root of the otic ganglion*.

⁵ Formerly known also as the *gustatory nerve*.

⁶ See Appendix, note 449.

⁷ The terminal branches of the *nervus ethmoidalis anterior* of the German nomenclature. See Appendix, note 449.

⁸ See Appendix, note 459.

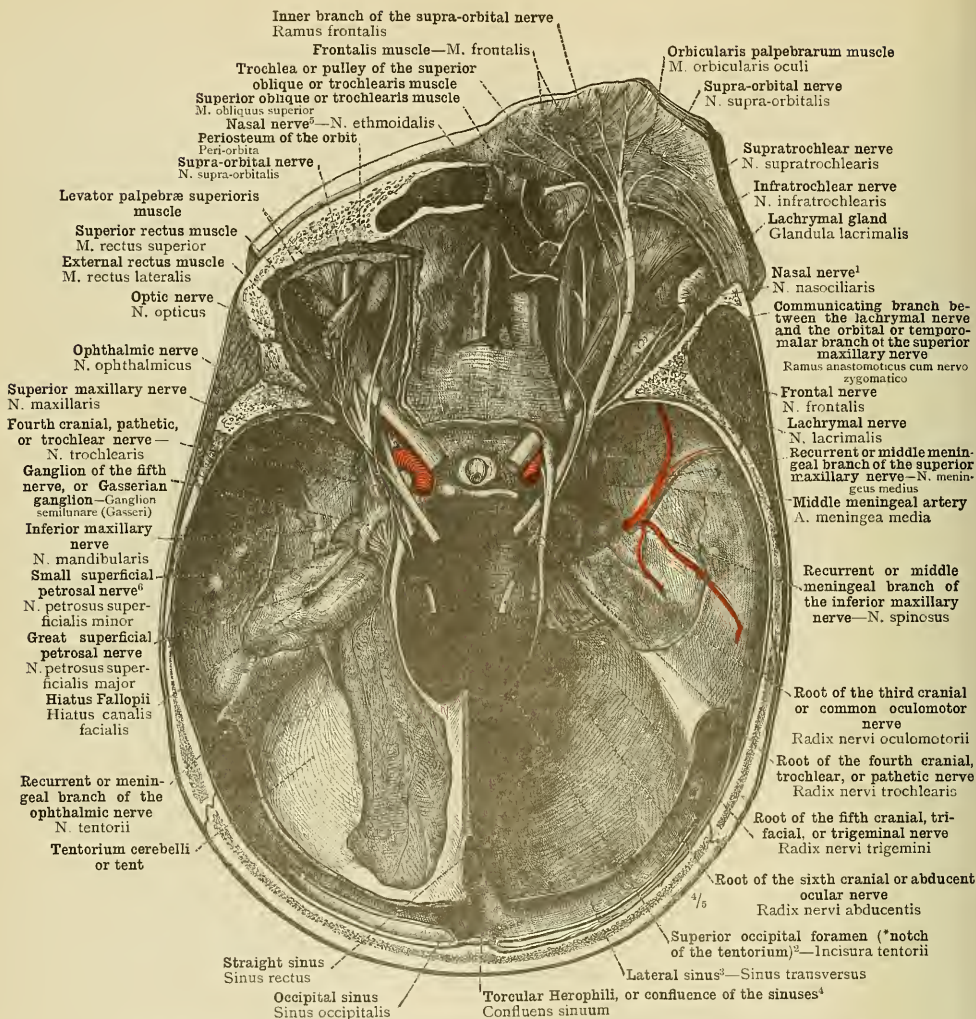
¹ Known also as the *oculomotor* and as the *nasociliary* nerve.² See Appendix, note 412.³ See Appendix, note 412.⁴ In this specimen the somewhat exceptional condition of a true confluence is exhibited. See Appendix to Part V., note 266.⁵ See Appendix, note 449.⁶ By Arnold called the long root of the otic ganglion.

FIG. 1299.—THE OPHTHALMIC NERVE, N. OPHTHALMICUS, OR FIRST DIVISION OF THE FIFTH CRANIAL, TRIFACIAL, OR TRIGEMINAL NERVE, N. TRIGEMINUS, AND ALSO THE UPPER BRANCH OF THE THIRD CRANIAL OR COMMON OCULOMOTOR NERVE, RAMUS SUPERIOR NERVI OCULOMOTORII, AND THE FOURTH CRANIAL, PATHETIC, OR TROCHLEAR NERVE, N. TROCHLEARIS, DISPLAYED BY THE REMOVAL OF THE UPPER WALL OF THE ORBIT. THE NERVES OF THE DURA MATER: THE RECURRENT OR MENINGEAL BRANCH OF THE OPHTHALMIC NERVE, N. TENTORII (WITH REGARD TO THE ORIGIN OF THIS NERVE, FIG. 1304 SHOULD BE EXAMINED); THE RECURRENT OR MIDDLE MENINGEAL BRANCH OF THE SUPERIOR MAXILLARY NERVE, N. MENINGEUS MEDIUS; AND THE RECURRENT OR MIDDLE MENINGEAL BRANCH OF THE INFERIOR MAXILLARY NERVE, N. SPINOSUS.

On the left side of the body the upper margin of the orbit has been left intact, but the levator palpebrae superioris and superior rectus muscles have on this side been detached from their origins and turned outwards, in order to show the branches of the third cranial or common oculomotor nerve that enter these muscles.

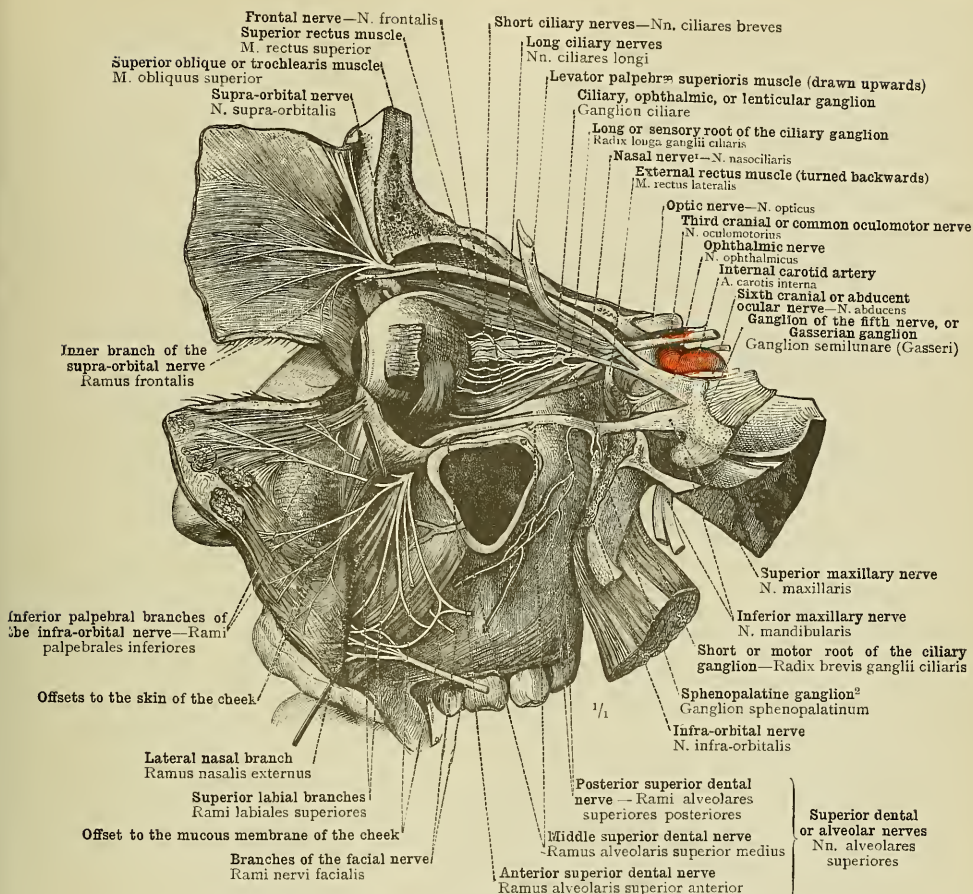
¹ Known also as the *nasociliary* and as the *oculonasal* nerves.² Known also as *Meckel's ganglion* and as the *nasal ganglion*.³ The *quadratus labii superioris* muscle of Continental anatomists comprises three muscles in the English nomenclature, viz., the levator labii superioris alaeque nasi, levator labii superioris proprius, and zygomaticus minor. See Fig. 545, p. 300, in Part III.

FIG. 1300.—THE SUPERIOR MAXILLARY NERVE, N. MAXILLARIS, OR SECOND DIVISION OF THE FIFTH CRANIAL, TRIFACIAL, OR TRIGEMINAL NERVE, N. TRIGEMINUS, AND ITS CONNECTION WITH THE SPHENOPALATINE GANGLION (MECKEL'S GANGLION, OR THE NASAL GANGLION), GANGLION SPHENOPALATINUM, BY MEANS OF THE TWO SPHENOPALATINE NERVES, NN. SPHENOPALATINI. THE SUPERIOR DENTAL OR ALVEOLAR NERVES, NN. ALVEOLARES SUPERIORES. THE FACIAL RADIATION OF THE TERMINAL BRANCHES OF THE INFRA-ORBITAL NERVE, WHICH, BY THEIR UNION WITH THE INFRA-ORBITAL BRANCHES OF THE FACIAL NERVE, FORM THE INFRA-ORBITAL PLEXUS. IN CONNECTION WITH THE OPHTHALMIC NERVE, OR FIRST DIVISION OF THE FIFTH CRANIAL NERVE, THE FRONTAL NERVE, N. FRONTALIS, AND THE CILIARY, OPHTHALMIC, OR LENTICULAR GANGLION, GANGLION CILIARE, WITH THE CILIARY NERVES, NN. CILIAIRES, THAT ENTER THE EYEBALL, ARE DISPLAYED. LEFT SIDE OF FACE, SEEN FROM THE LEFT SIDE.

The skin of the forehead and the cheek and the superficial facial muscles have been dissected up and turned forwards. This having been done, the lower jaw was removed, and the outer wall of the orbit and the outer wall of the skull were cut away until the sphenomaxillary fossa, fossa pterygopalatina, was reached. The levator palpebrae superioris and external rectus muscles have been cut across and their proximal segments turned backwards. The quadratus labii superioris muscle (see note 3 above), which covers the infra-orbital plexus, has been drawn forwards with a hook.

Trigeminus Group.

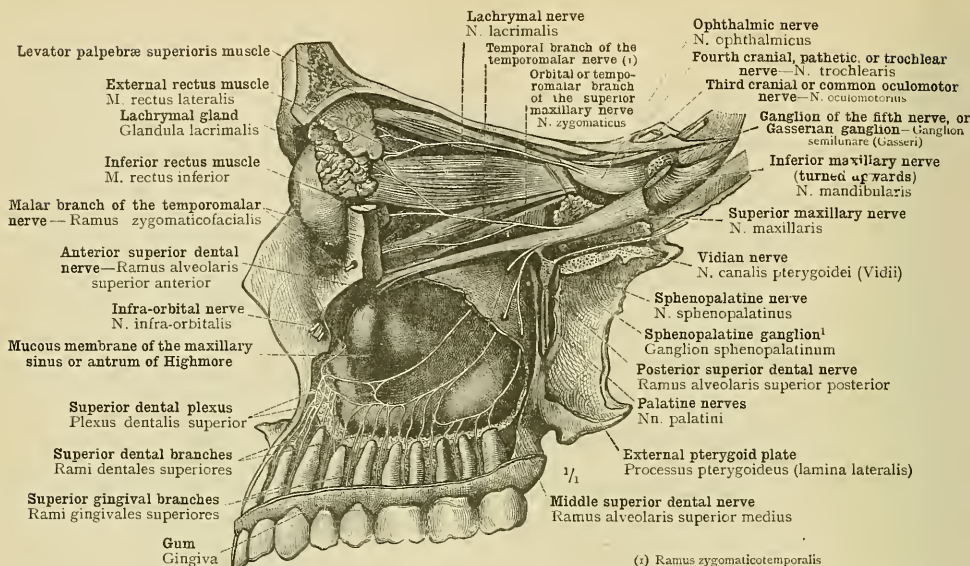


FIG. 1301.—THE SUPERIOR DENTAL OR ALVEOLAR NERVES, NN. ALVEOLARES SUPERIORES, WITH THE SUPERIOR DENTAL PLEXUS, PLEXUS DENTALIS SUPERIOR, AND THE SUPERIOR DENTAL AND SUPERIOR GINGIVAL BRANCHES, RAMI DENTALES SUPERIORES ET RAMI GINGIVALES SUPERIORES, DISPLAYED BY THE REMOVAL OF THE OUTER LAMELLA OF THE SUPERIOR MAXILLARY BONE. THE OPBITAL OR TEMPOROMAXILLARY BRANCH OF THE SUPERIOR MAXILLARY NERVE, N. ZYGOMATICUS, AND ITS COMMUNICATION WITH THE LACHRYMAL NERVE, N. LACHRYMALIS. LEFT SIDE OF THE FACE, SEEN FROM THE LEFT SIDE.

In the maxillary sinus or antrum of Highmore the outer surface of the mucous membrane is exposed.

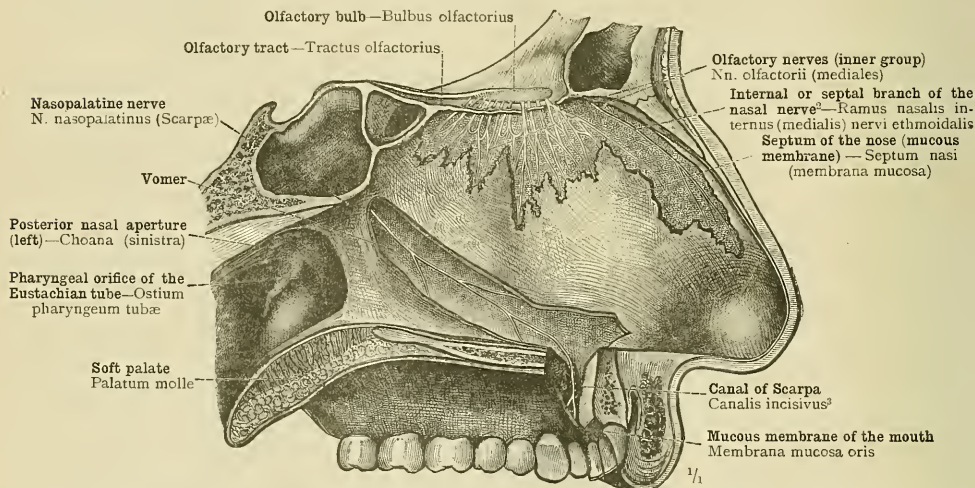


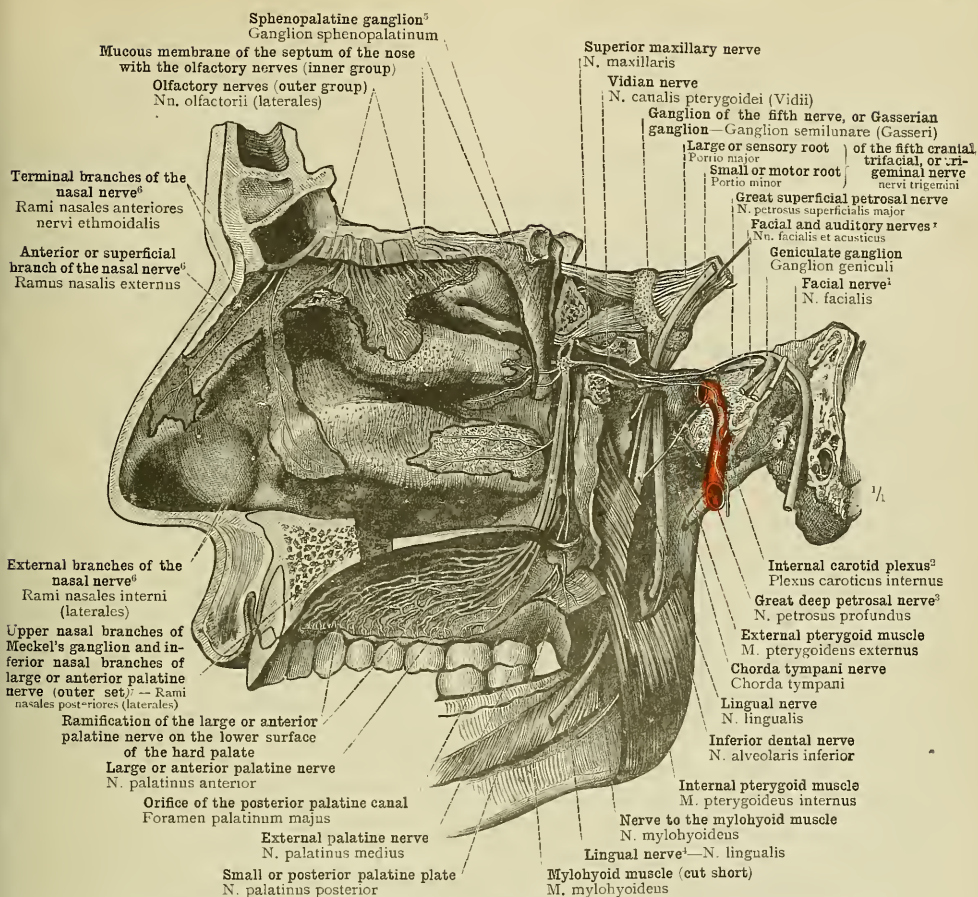
FIG. 1302.—THE OLFACTORY NERVES, NN. OLFACTORII, THE INTERNAL OR SEPTAL BRANCH OF THE NASAL NERVE, RAMUS NASALIS INTERNUS (MEDIALIS) NERVI ETHMOIDALIS, AND THE NASOPALATINE NERVE, N. NASOPALATINUS, A BRANCH OF THE SPHENOPALATINE GANGLION (MECKEL'S GANGLION OR THE NASAL GANGLION), GANGLION SPHENOPALATINUM.

These nerves have been laid bare on the right side of the nasal septum by the partial removal of the mucous membrane.

¹ Known also as *Meckel's ganglion* and as the *nasal ganglion*.

² See Appendix, note 449.

³ See Appendix, note 451.



¹ In Soemmerring's enumeration the *facialis* is the seventh, the auditory the eighth cranial nerve; in that of Willis, the former is the *portio dura*, the latter the *portio mollis*, of the seventh cranial nerve.

² See note 1 to p. 859. ³ See Appendix, note 435.

⁴ Known also as *Meckel's ganglion*, and as the *nasal ganglion*.

⁵ Formerly known also as the *gustatory nerve*.

⁶ See Appendix, note 435.

⁷ See Appendix, note 435.

FIG. 1303.—THE SPHENOPALATINE GANGLION (MECKEL'S GANGLION, OR THE NASAL GANGLION), GANGLION SPHENOPALATINUM. THE ROOTS OF THIS GANGLION: THE SPHENOPALATINE NERVES, NN. SPHENOPALATINI FORMING THE SENSORY ROOT; THE WHITE PORTION OF THE VIDIAN NERVE, N. CANALIS PTERYGOIDEI (VIDII), VIZ., THE GREAT SUPERFICIAL PETROSAL NERVE, N. PETROSUS SUPERFICIALIS MAJOR, FORMING THE MOTOR ROOT; AND THE GREY PORTION OF THE VIDIAN NERVE, VIZ., THE GREAT DEEP PETROSAL NERVE, N. PETROSUS PROFUNDUS, FORMING THE SYMPATHETIC ROOT. THE NASOPALATINE RADIATION OF THE SUPERIOR MAXILLARY NERVE, N. MAXILLARIS, IN THE FORM OF BRANCHES OF MECKEL'S GANGLION. THE UPPER AND LOWER (POSTERIOR) NASAL BRANCHES, RAMI NASALES POSTERIORES (see Appendix, note 450), AND THE PALATINE NERVES, NN. PALATINI. THE ANTERIOR OR SUPERFICIAL BRANCH, THE EXTERNAL BRANCH, AND THE INTERNAL OR SEPTAL BRANCH OF THE NASAL NERVE, RAMI NASALES ANTERIORES (LATERALES) NERVI ETHMOIDALIS. THE EMERGENCE FROM THE FORAMEN OVALE OF THE INFERIOR MAXILLARY NERVE, N. MANDIBULARIS, OR THIRD DIVISION OF THE FIFTH CRANIAL, TRIFACIAL, OR TRIGEMINAL NERVE, AND THE UNION OF THE LINGUAL NERVE WITH THE CHORDA TYMPANI NERVE. THE RAMIFICATION OF THE OLFACTORY NERVES (OUTER GROUP), NN. OLFACTORII (LATERALES), ON THE SUPERIOR AND MIDDLE TURBinate BONES OF THE NOSE.

In the right half of a sagittally hemisected head, the tongue, the greater part of the soft palate, and the pharynx were removed; the middle portion of the base of the skull was then cut away until the carotid canal was reached, and this canal as well as the Vidian canal, the internal auditory meatus, and the aqueduct of Fallopius, were opened. The ganglion of the fifth nerve or Gasserian ganglion, ganglion semilunare, was turned outwards, in order to display the small or motor root of the trigeminal nerve, portio minor nervi trigemini, which runs along the under surface of the ganglion. Of the mucous membrane of the septum of the nose a narrow strip has been preserved, on the upper part of which the olfactory nerves of the inner group are visible.

Trigeminus Group.—Nn. olfactorii—The olfactory nerves.

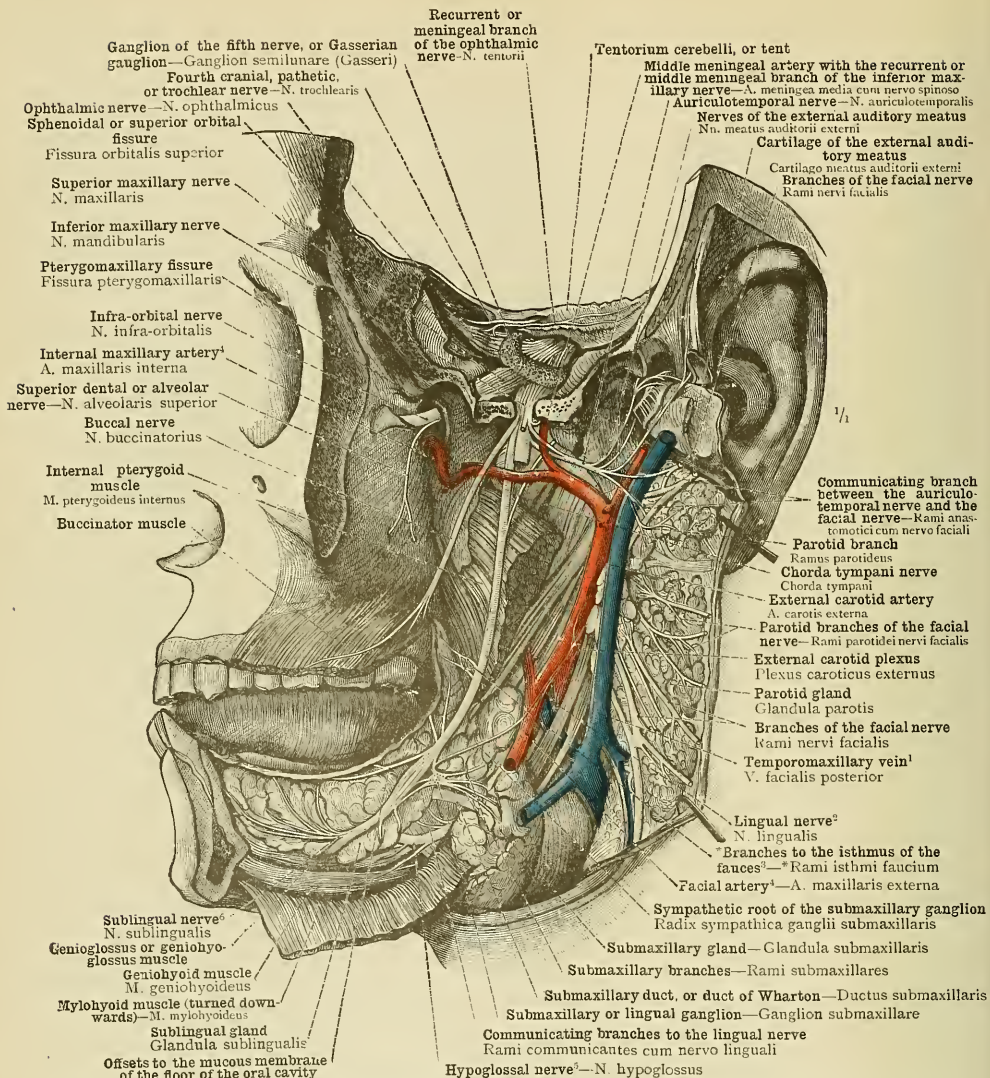


FIG 1304.—THE INFERIOR MAXILLARY NERVE, N. MANDIBULARIS, OR THIRD DIVISION OF THE FIFTH CRANIAL, TRIFACIAL, OR TRIGEMINAL NERVE, N. TRIGEMINUS. ITS MOTOR BRANCHES AND ALSO THE INFERIOR DENTAL OR ALVEOLAR NERVE, N. ALVEOLARIS INFERIOR, HAVE BEEN CUT SHORT CLOSE TO THE BASE OF THE SKULL.

On the left side of the head in front of the ear the parotid gland was removed through a vertical incision, the left half of the inferior maxillary bone was taken away, and between the malar bone and the external auditory meatus a wedge-shaped piece of the base of the skull, the apex of which was at the foramen ovale, was removed by two saw-cuts. The hinder portion of the parotid gland has been turned backwards with the superimposed skin.

¹ Sometimes called the *posterior facial vein*. See Appendix to Part V., note 293.

² Formerly known also as the *gustatory nerve*.

³ Neither in the nomenclature of Quain nor in that of Macalister are the "branches to the isthmus of the fauces" distinguished by name from the other branches furnished by the lingual nerve to the mucous membrane of the mouth.

⁴ See Appendix to Part V., note 166.

⁵ The *fifth cranial nerve* in Sömmerring's enumeration, *ninth cranial nerve* in that of Willis; sometimes also known as the *lingual motor nerve*.

⁶ See Appendix, note 453.

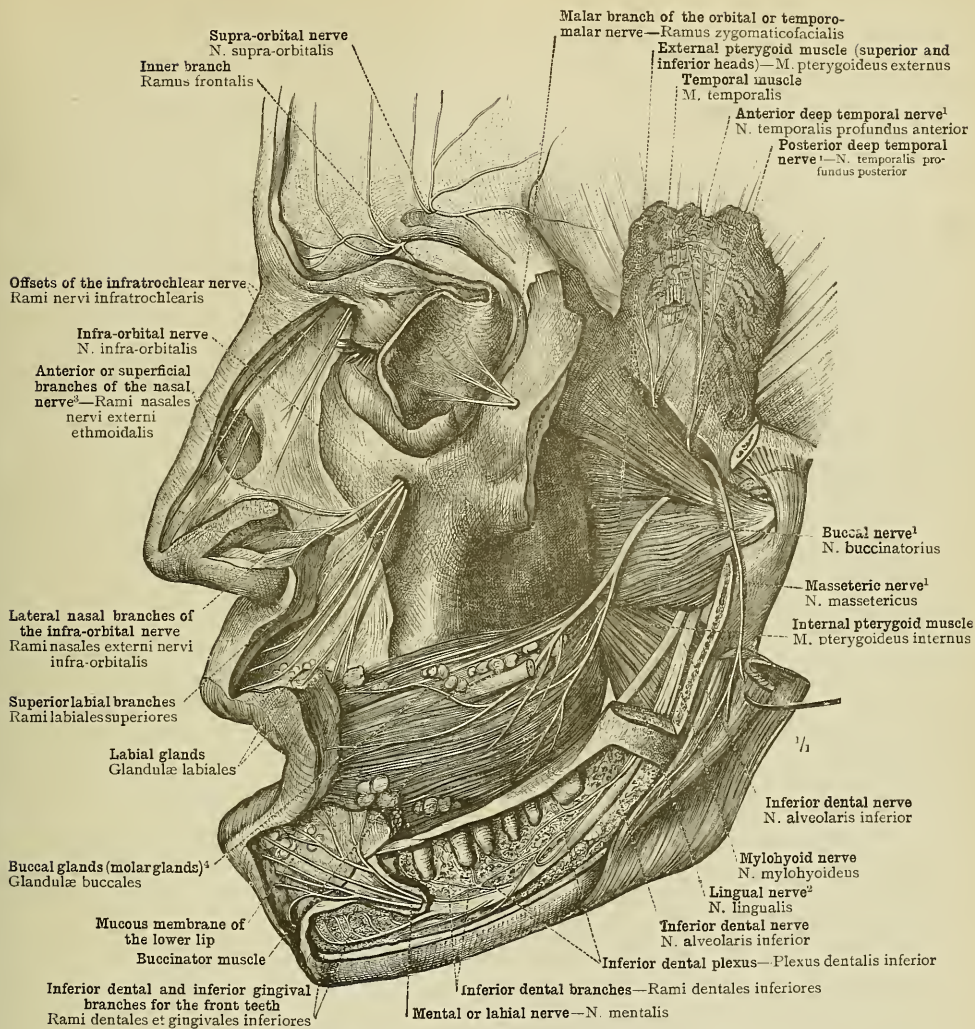
¹ See Appendix, note 454.² See Appendix, note 449 and note 7 to p. 859.³ Formerly known also as the *gustatory nerve*.⁴ See note ¹ to p. 413, in Part IV.

FIG. 1305.—THE INFERIOR DENTAL NERVE, N. ALVEOLARIS INFERIOR; ITS COURSE THROUGH THE MANDIBULAR OR INFERIOR DENTAL CANAL, WITH THE INFERIOR DENTAL PLEXUS, PLEXUS DENTALIS INFERIOR, AND ITS TERMINAL BRANCH, THE MENTAL OR LABIAL NERVE, N. MENTALIS. THE BUCCAL NERVE, N. BUCCINATORIUS. OF THE MOTOR BRANCHES OF THE INFERIOR MAXILLARY NERVE, N. MANDIBULARIS, THE ANTERIOR AND POSTERIOR DEEP TEMPORAL NERVES, NM. TEMPORALES PROFUNDI ANTERIOR ET POSTERIOR (see Appendix, note 454), AND THE MASSETERIC NERVE, N. MASSETERICUS, ARE SEEN. THE MALAR BRANCH OF THE ORBITAL OR TEMPOROMALAR NERVE, RAMUS ZYGOMATICOFACIALIS NERVI ZYGOMATICI; THE SUPERIOR LABIAL AND LATERAL NASAL BRANCHES OF THE INFRA-ORBITAL NERVE, RAMI LABIALES SUPERIORES ET RAMI NASALES EXTERNI NERVI INFRA-ORBITALIS; AND THE ANTERIOR OR SUPERFICIAL BRANCHES OF THE NASAL NERVE, RAMI NASALES EXTERNI NERVI ETHMOIDALIS. THE BRANCHES OF THE OPHTHALMIC NERVE TO THE SKIN OF THE FRONTAL REGION.

The parts were exposed by the removal of the zygomatic arch, the front of the ramus of the inferior maxillary bone, and the outer compact lamella of the body of that bone. In order to display the deep temporal nerves, the lower part of the temporal muscle was cut away.

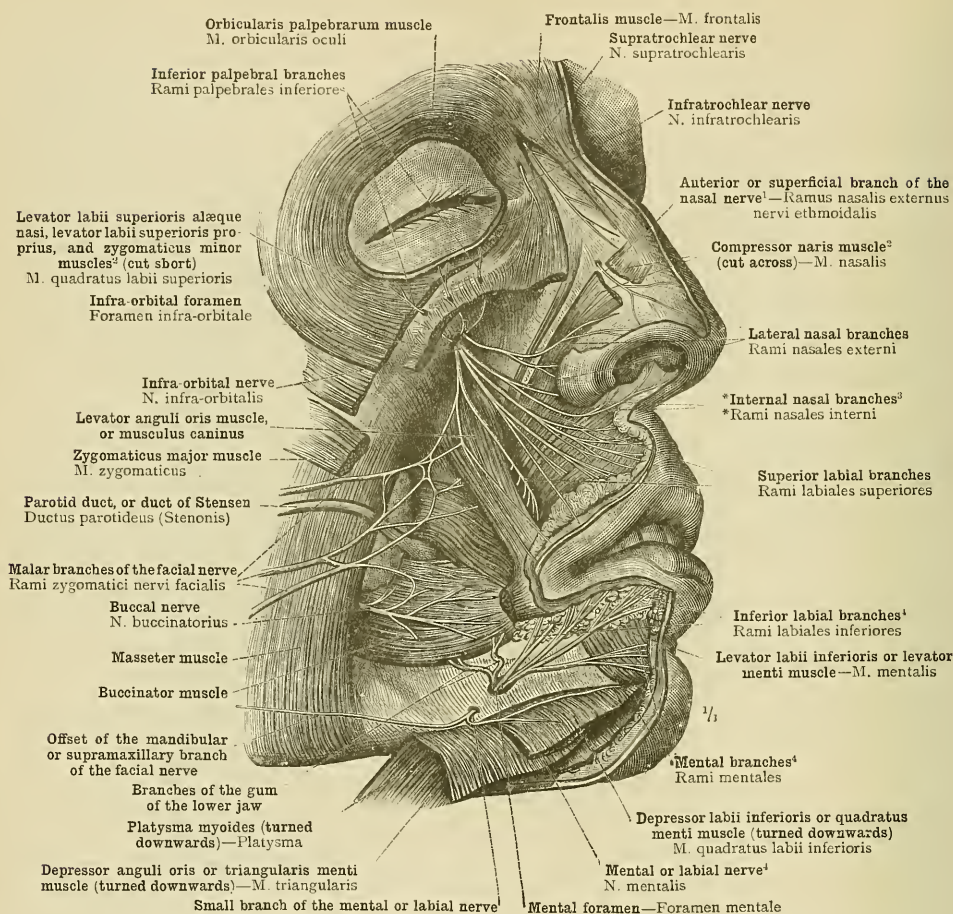
¹ See Appendix, note 449 and note 7 to p. 859.² See note 1 to p. 303, in Part III.³ See Appendix, note 455.⁴ See Appendix, note 456.

FIG. 1306.—PART OF THE FACIAL RADIATION OF THE SUPERIOR MAXILLARY NERVE, N. MAXILLARIS (THE INFRA-ORBITAL PLEXUS), WITH THE CUTANEOUS NERVES OF THE NOSE AND THE NERVES OF THE UPPER AND LOWER LIPS: THE BRANCHES OF THE INFRA-ORBITAL NERVE TO THE SKIN OF THE CHEEK, THE ALA OF THE NOSE, THE SEPTUM OF THE NOSE, AND THE LOWER LID: SUPERIOR LABIAL BRANCHES (RAMI LABIALES SUPERIORES), LATERAL NASAL AND *INTERNAL NASAL BRANCHES (RAMI NASALES EXTERNI ET INTERNI—see Appendix, notes 449, 456, and note 1 to p. 859), AND INFERIOR PALPEBRAL BRANCHES (RAMI PALPEBRALES INFERIORES). THE COMMUNICATIONS BETWEEN THESE NERVES AND THE BRANCHES OF THE FACIAL NERVE. THE DISTRIBUTION OF THE SUPRATROCHLEAR NERVE, N. SUPRATROCHLEARIS, AND THE INFRA-TROCHLEAR NERVE, N. INFRA-TROCHLEARIS, BRANCHES OF THE FIRST DIVISION OF THE FIFTH NERVE; AND THE TERMINAL RAMIFICATION OF THE BUCCAL NERVE, N. BUCCINATORIUS, AND THE MENTAL OR LABIAL NERVE, N. MENTALIS, BRANCHES OF THE THIRD DIVISION OF THE FIFTH NERVE. A SMALL BRANCH OF THE MENTAL NERVE WHICH EMERGES FROM THE INFERIOR MAXILLARY BONE BY A SPECIAL APERTURE IS SEEN TO COMMUNICATE WITH THE MANDIBULAR OR SUPRAMAXILLARY BRANCH OF THE FACIAL NERVE.

Preparation of the right side of the face after removing the skin and the superficial layer of the muscles of the face. The compressor naris muscle has been cut across, in order to display the emergence on to the outer surface of the nose of the anterior or superficial branch of the nasal nerve (ramus nasalis externus nervi nasocillaris).

Trigeminus Group.

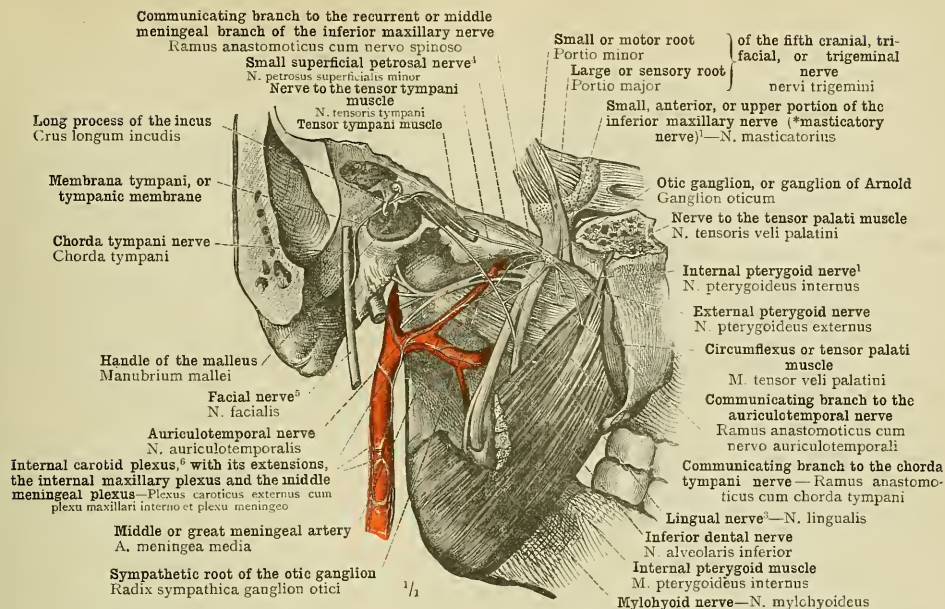


FIG. 1307.—THE OTIC GANGLION OR GANGLION OF ARNOLD, GANGLION OTICUM; ITS ROOTS AND BRANCHES. DISPLAYED ON THE LEFT SIDE OF THE HEAD, AND VIEWED FROM WITHIN.

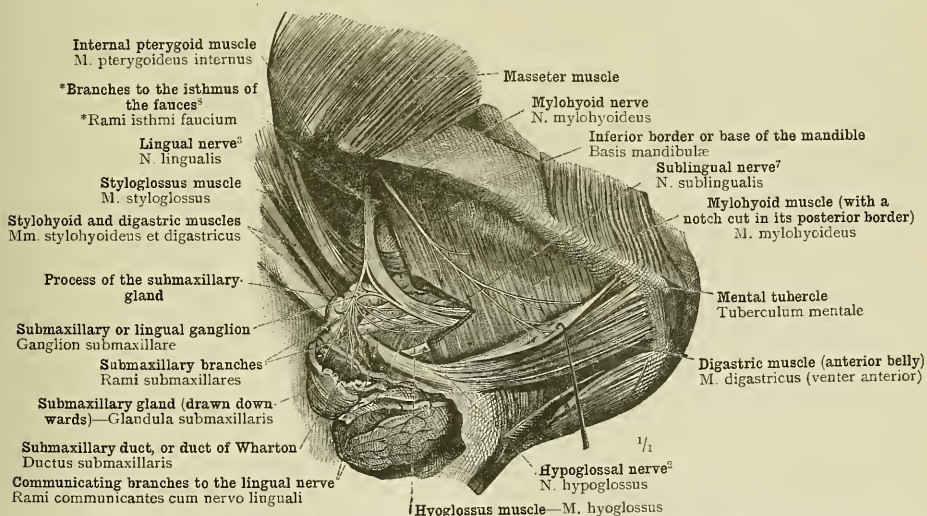


FIG. 1308.—THE SUBMAXILLARY OR LINGUAL GANGLION, GANGLION SUBMAXILLARE, AND ITS BRANCHES, WITH THE MYLOHYOID NERVE, DISPLAYED IN THE RIGHT SUBMAXILLARY REGION. SEEN OBLIQUELY FROM BELOW.

The submaxillary gland has been shelled out of its bed and drawn downwards.

¹ See Appendix, note 457.

² Twelfth cranial nerve in Soemmerring's enumeration, ninth in that of Willis; known also as the lingual motor nerve.

³ Formerly known as the ganglionic nerve.

⁴ By Arnold called the long root of the otic ganglion. See also Appendix, note 459.

⁵ Seventh cranial nerve in Soemmerring's enumeration; portio dura of the seventh cranial nerve in that of Willis.

⁶ See note 3 to p. 859.

⁷ See Appendix, note 413.

⁸ See note 3 to p. 864.

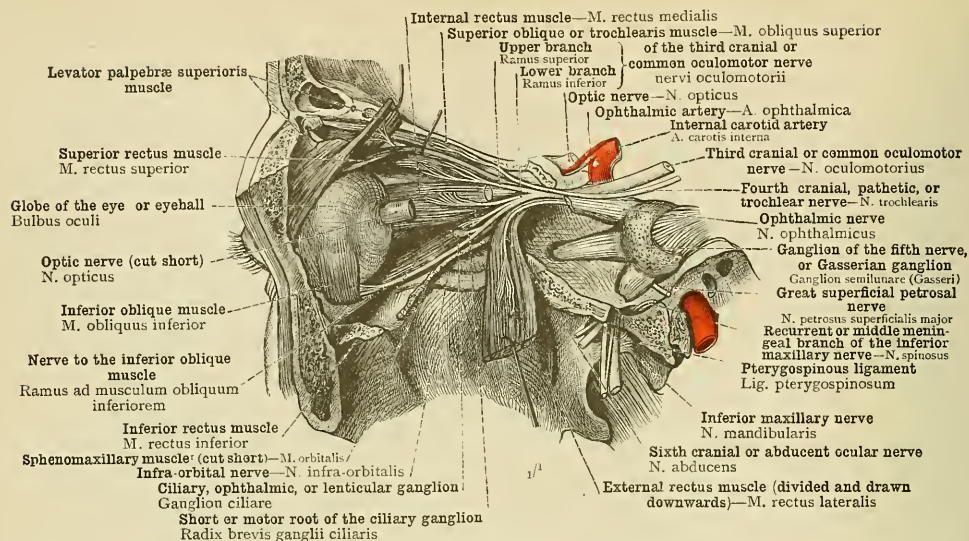


FIG. 1309.—THE NERVES OF THE EXTERNAL MUSCLES OF THE EYE: THIRD CRANIAL OR COMMON OCULOMOTOR NERVE, N. OCULOMOTORIUS, FOURTH CRANIAL, PATHETIC, OR TROCHLEAR NERVE, N. TROCHLEARIS, AND SIXTH CRANIAL OR ABDUCENT OCULAR NERVE, N. ABDUCENS, DISPLAYED BY THE REMOVAL OF THE OUTER AND UPPER WALLS OF THE LEFT ORBIT.

The levator palpebrae superioris and external rectus muscles have been cut across and turned aside.

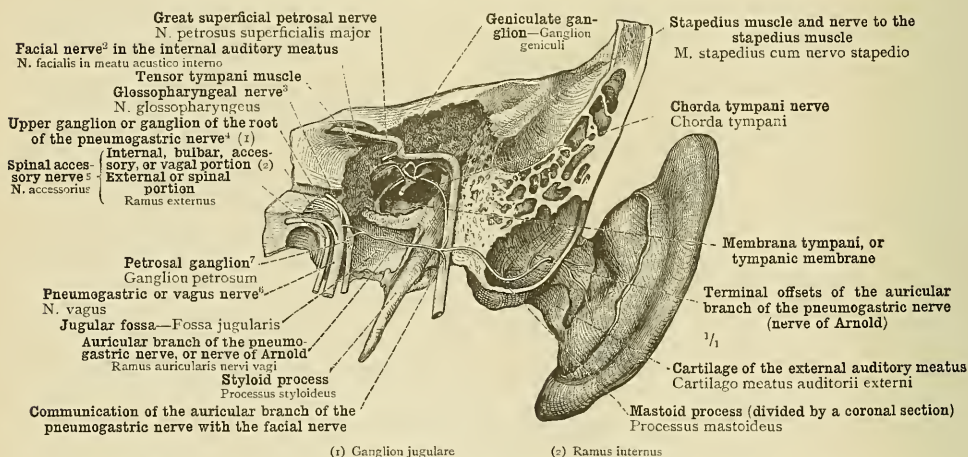


FIG. 1310.—THE FACIAL NERVE, N. FACIALIS (see note ² below); ITS COURSE THROUGH THE AQUEDUCT OF FALLOPIUS, WITH THE BRANCHES SUPPLIED BY THE NERVE DURING THIS PART OF ITS COURSE; DISPLAYED FROM BEHIND IN THE RIGHT PETROUS BONE. THE AURICULAR BRANCH OF THE PNEUMOGASTRIC NERVE OR NERVE OF ARNOLD, RAMUS AURICULARIS NERVI VAGI, AND THE COMMUNICATION BETWEEN THE GLOSSOPHARYNGEAL NERVE, N. GLOSSOPHARYNGEUS, AND THE AURICULAR BRANCH OF THE PNEUMOGASTRIC NERVE BY MEANS OF THE RAMUS ANASTOMOTICUS CUM RAMO AURICULARI NERVI VAGI.

¹ See Appendix, note 43².

² Seventh cranial nerve in Soemmerring's enumeration; *portio dura* of the seventh cranial nerve in that of Willis.

³ Ninth cranial nerve in Soemmerring's enumeration; *first trunk* of the eighth cranial nerve in that of Willis.

⁴ See Appendix, note 44⁷.

⁵ Eleventh cranial nerve in Soemmerring's enumeration; *third trunk* of the eighth cranial nerve in that of Willis.

⁶ Tenth cranial nerve in Soemmerring's enumeration; *second trunk* of the eighth cranial nerve in that of Willis.

⁷ Also known as *Andersch's ganglion*.

Trigeminus Group.—Auricular Branch of the Pneumogastric Nerve, or Nerve of Arnold, Ramus Auricularis Nervi Vagi.

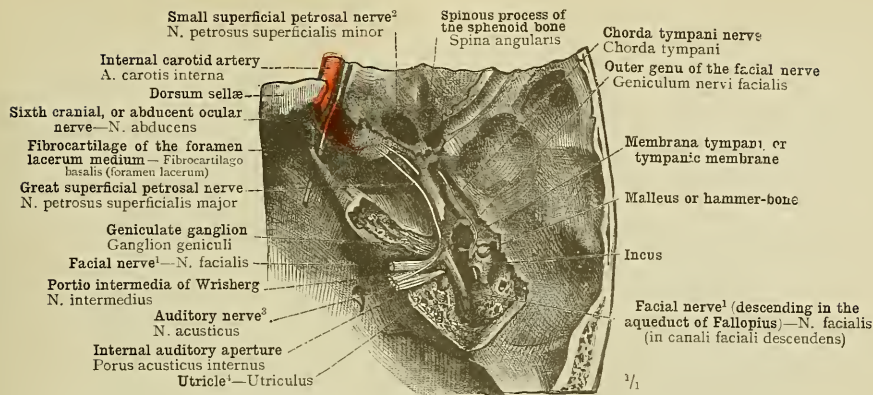


FIG. 1311.—THE CHORDA TYMPANI NERVE, CHORDA TYMPANI, AND THE GREAT SUPERFICIAL PETROSAL NERVE, N. PETROSUS SUPERFICIALIS MAJOR, DISPLAYED FROM ABOVE IN THE REGION OF THE RIGHT PETROUS BONE, THE TYMPANIC CAVITY OR TYMPANUM AND THE INTERNAL AUDITORY MEATUS HAVING BEEN OPENED UP. THE PORTIO INTERMEDIA OF WRISBERG, N. INTERMEDIUS, AND THE GENICULATE GANGLION, GANGLION GENICULI.

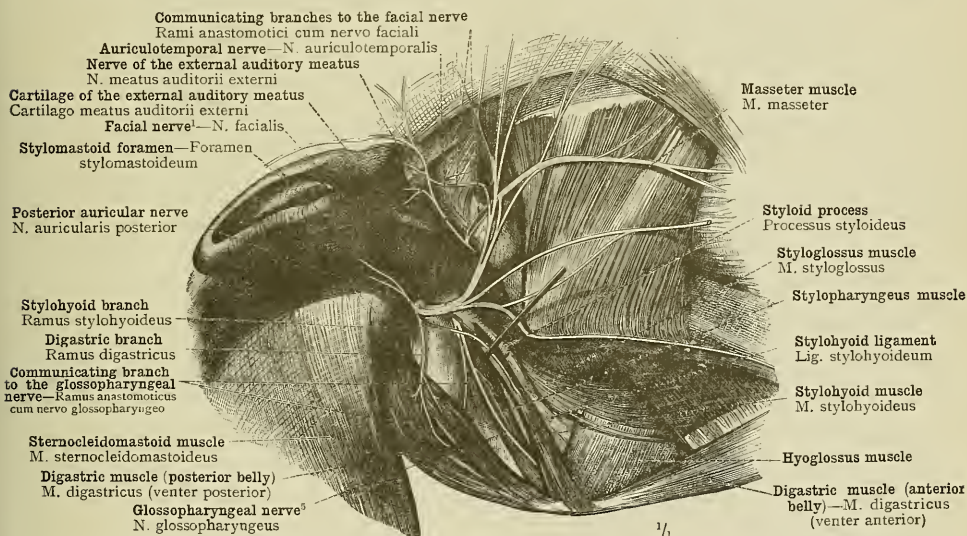


FIG. 1312.—THE EMERGENCE OF THE FACIAL NERVE, N. FACIALIS (see note ¹ below), FROM THE STYLOMASTOID FORAMEN, FORAMEN STYLOMASTOIDEUM, ITS RAMIFICATION IN THE RETROMANDIBULAR FOSSA, FOSSA RETROMANDIBULARIS, AND ITS COMMUNICATING BRANCHES TO THE GLOSSOPHARYNGEAL NERVE, N. GLOSSOPHARYNGEUS, AND THE AURICULOTEMPORAL NERVE, N. AURICULOTEMPORALIS, IS DISPLAYED ON THE RIGHT SIDE OF THE HEAD BY THE COMPLETE REMOVAL OF THE PAROTID GLAND. THE COMMUNICATING BRANCH BETWEEN THE FACIAL NERVE AND THE GLOSSOPHARYNGEAL NERVE HAS THE FORM OF A LOOP, WHICH PERFORATES THE POSTERIOR BELLY OF THE DIGASTRIC MUSCLE. SEEN OBliquely FROM BELOW.

¹ Seventh cranial nerve in Soemmerring's enumeration; portio dura of the seventh cranial nerve in that of Willis.

² By Arnold called the long root of the ciliary ganglion.

³ Eighth cranial nerve in Soemmerring's enumeration; portio mollis of the seventh cranial nerve in that of Willis.

⁴ Known also as the common sinus of the membranous semicircular canals.

⁵ Ninth cranial nerve in Soemmerring's enumeration; first trunk of the eighth cranial nerve in that of Willis.

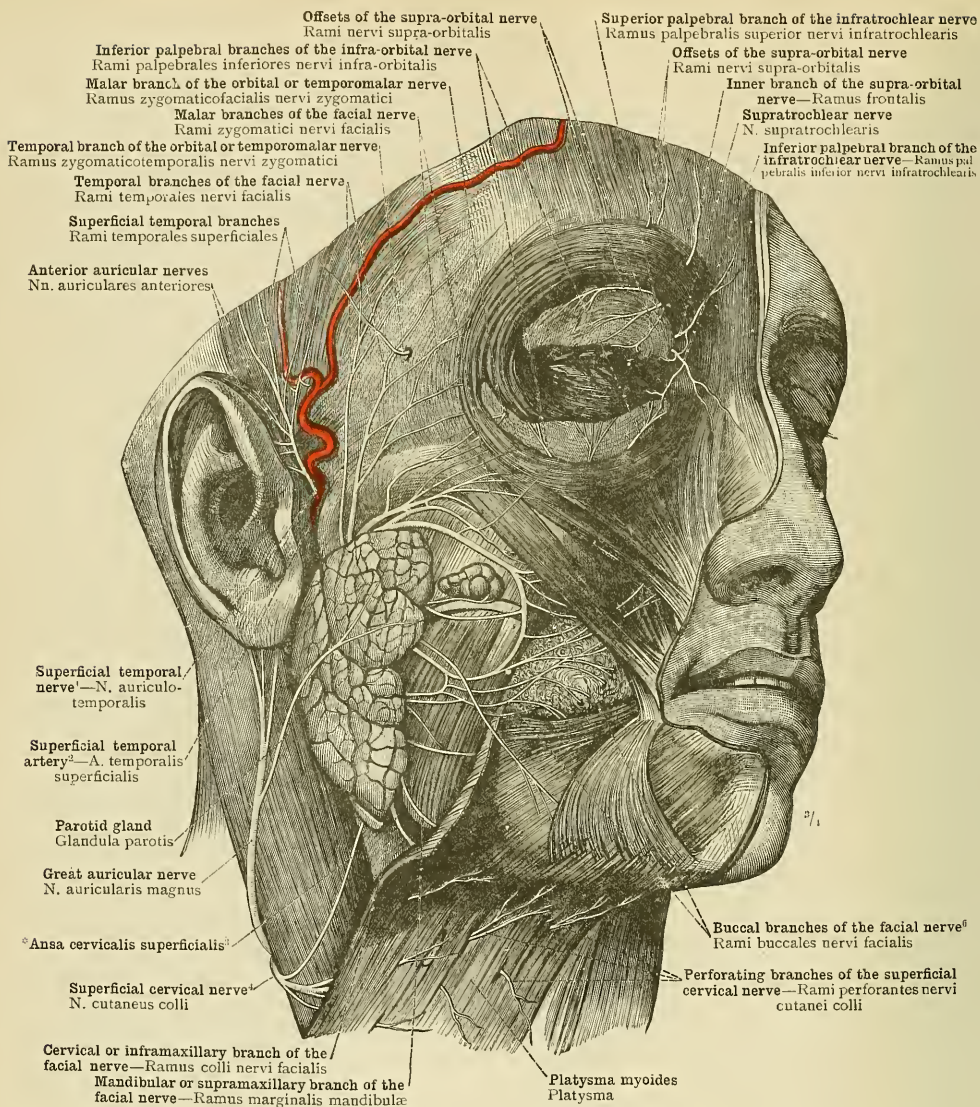


FIG. 1313.—THE FACIAL NERVE, N. FACIALIS; ITS BRANCHES AS FAR AS THEY ARE VISIBLE WHEN THE PAROTID GLAND, THE SUPERFICIAL MUSCLES OF THE FACE, AND THE BUCCAL FAT-PAD, CORPUS ADIPOSUM BUCCE (see note ⁵ below), ARE LEFT INTACT. RIGHT SIDE OF THE FACE. THE BRANCHES OF THE CERVICAL PLEXUS AND OF THE OPHTHALMIC NERVE, OR FIRST DIVISION OF THE FIFTH CRANIAL NERVE, TO THE FACE AND THE UPPER PART OF THE NECK; OF THE FACIAL BRANCHES OF THE SUPERIOR MAXILLARY NERVE, OR SECOND DIVISION OF THE FIFTH CRANIAL NERVE, THOSE OF THE ORBITAL OR TEMPOROMALAR NERVE, N. ZYGOMATICUS, HAVE ALONE BEEN PRESERVED.

In order to expose the course of the nerves supplying the eyelids, a part of the orbicularis palpebrarum muscle, musculus orbicularis oculi, which covers these nerves has been cut away.

¹ See Appendix, note 459.

² See Appendix to Part V., note 168.

³ See Appendix, note 400.

⁴ By Macalister called the *superficialis colli* nerve.

⁵ The *buccal fat-pad* is sometimes, but inappropriately, named the *sucking-pad*.

⁶ Also called *inferior buccolabial branches of the facial nerve*.

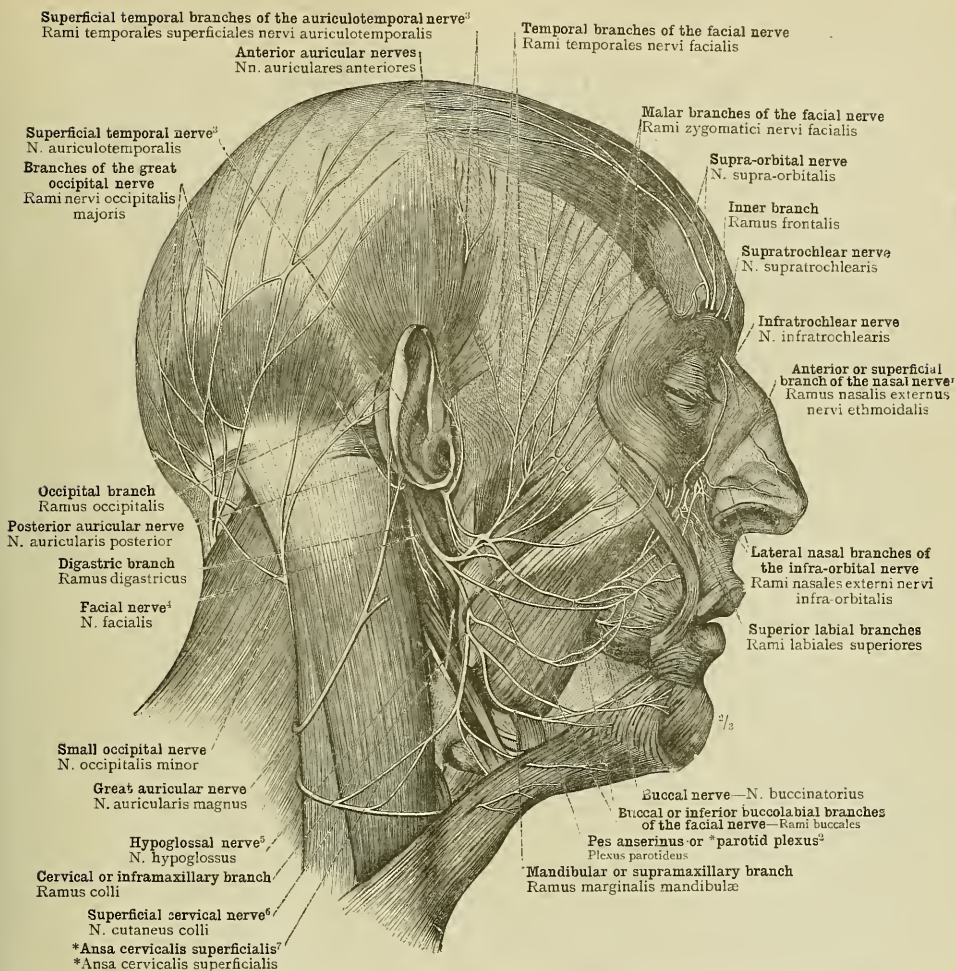


FIG. 1314.—THE RAMIFICATION OF THE FACIAL NERVE, N. FACIALIS (see note ⁴ below), DISPLAYED BY THE REMOVAL OF THE PAROTID GLAND AND SOME OF THE SUPERFICIAL MUSCLES OF THE FACE. RIGHT SIDE OF THE FACE. THE COMMUNICATING BRANCHES FROM THE FACIAL NERVE TO THE AURICULOTEMPORAL NERVE, TO THE INFRA-ORBITAL NERVE, AND TO THE SUPERFICIAL CERVICAL NERVE (see note ⁶ below). THE SENSORY NERVES OF THE FRONTAL REGION, OF THE SKIN OF THE NOSE, AND OF THE PINNA OR AURICLE; THE RAMIFICATION OF THE GREAT AND SMALL OCCIPITAL NERVES, NN. OCCIPITALES, MAJOR ET MINOR, ON THE BACK OF THE HEAD.

The upper part of the orbicularis palpebrarum muscle, musculus orbicularis oculi, and the lower part of the frontalis muscle, musculus frontalis, have been removed, in order to display the branches of the frontal nerve, nervus frontalis, emerging from the orbit. The upper and back portions of the platysma myoides have also been removed, in order to display the communication between the facial nerve and the superficial cervical nerve (*ansa cervicalis superficialis—see Appendix, note ⁴⁶⁹), and also the cervical or inframaxillary branch of the facial nerve. This latter branch has been drawn out of the interior of the retromandibular fossa by means of a hook.

¹ See Appendix, note 449 and note 7 to p. 859.

² See Appendix, note 465.

³ See Appendix, note 459.

⁴ Seventh cranial nerve in Soemmerring's enumeration; *portio duca* of the seventh cranial nerve in that of Willis.

⁵ Twelfth cranial nerve in Soemmerring's enumeration, ninth in that of Willis; also known as the lingual motor nerve.

⁶ By Macalister called the *superficialis colli* nerve.

⁷ See Appendix, note 446.

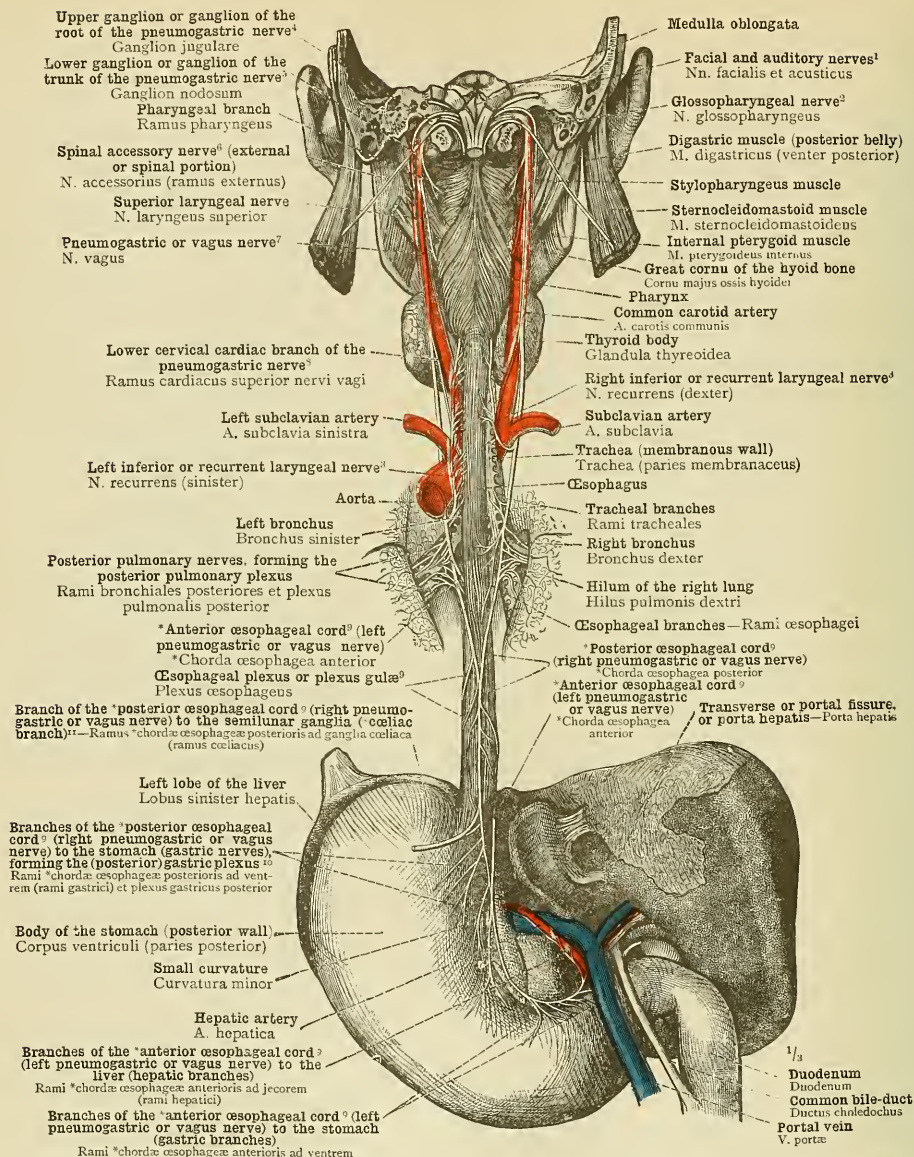


FIG. 1315.—THE PNEUMOGASTRIC OR VAGUS NERVE, N. VAGUS; VIEW OF ITS PRINCIPAL BRANCHES, AS SEEN FROM BEHIND IN RELATION TO THE VISCERA, WHICH HAVE BEEN REMOVED FROM THE BODY.

The course and distribution of the auricular branch of the pneumogastric nerve, or nerve of Arnold, ramus auricularis nervi vagi, are shown in Fig. 1310, p. 868.

¹ In Soemmerring's enumeration the *facial* is the *seventh*, the *auditory* is the *eighth* cranial nerve; in that of Willis the former is the *portio dura*, the latter the *portio mollis*, of the *seventh* cranial nerve.

² *Ninth* cranial nerve in Soemmerring's enumeration; *first* trunk of the *eighth* cranial nerve in that of Willis.

³ See Appendix, note 469. ⁴ See Appendix, note 468.

⁵ Sometimes called the *cervical* ganglion of the vagus nerve. Macalister uses the Latin equivalent, *ganglion cervicale vagi*.

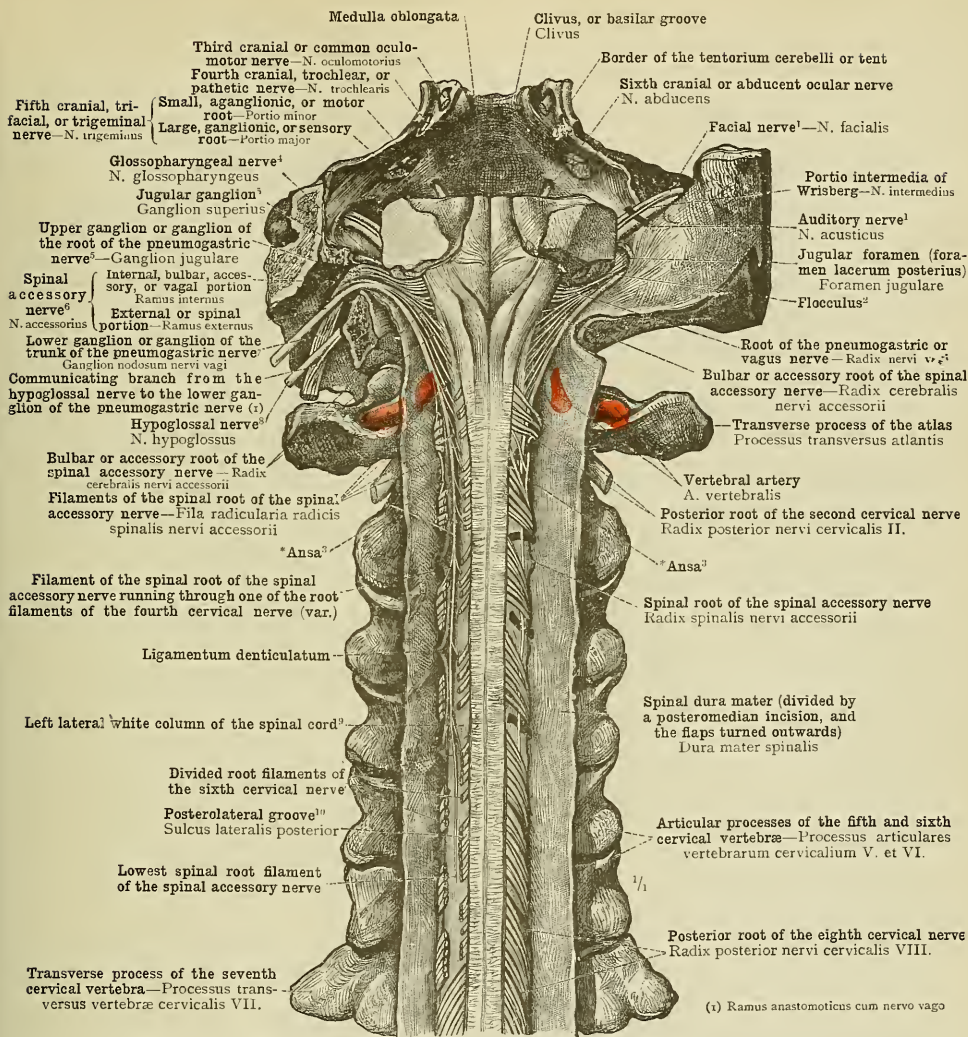
⁶ *Eleventh* cranial nerve in Soemmerring's enumeration; *third* trunk of the *eighth* cranial nerve in that of Willis.

⁷ *Tenth* cranial nerve in Soemmerring's enumeration; *second* trunk of the *eighth* cranial nerve in that of Willis.

⁸ See Appendix, note 467. ⁹ See Appendix, note 464.

¹⁰ See Appendix, note 465.

¹¹ See Appendix, note 466.



After removing the tabular portion of the occipital bone and the arches of the vertebrae, a posteromedian incision was made through the spinal dura mater and the flaps were turned upwards, the arachnoid was removed, and on the left side those portions of the posterior roots of the spinal nerves which cover the spinal root filaments of the spinal accessory nerve were cut out; on the right side strips of black paper were passed beneath the spinal root of this nerve. On the left side the nerves emerging through the jugular foramen (foramen jugulare, foramen lacerum posterius) were exposed.

¹¹ *Tenth cranial nerve* in Sæmmering's enumeration; *second trunk of the eighth cranial nerve* in that of Willis.

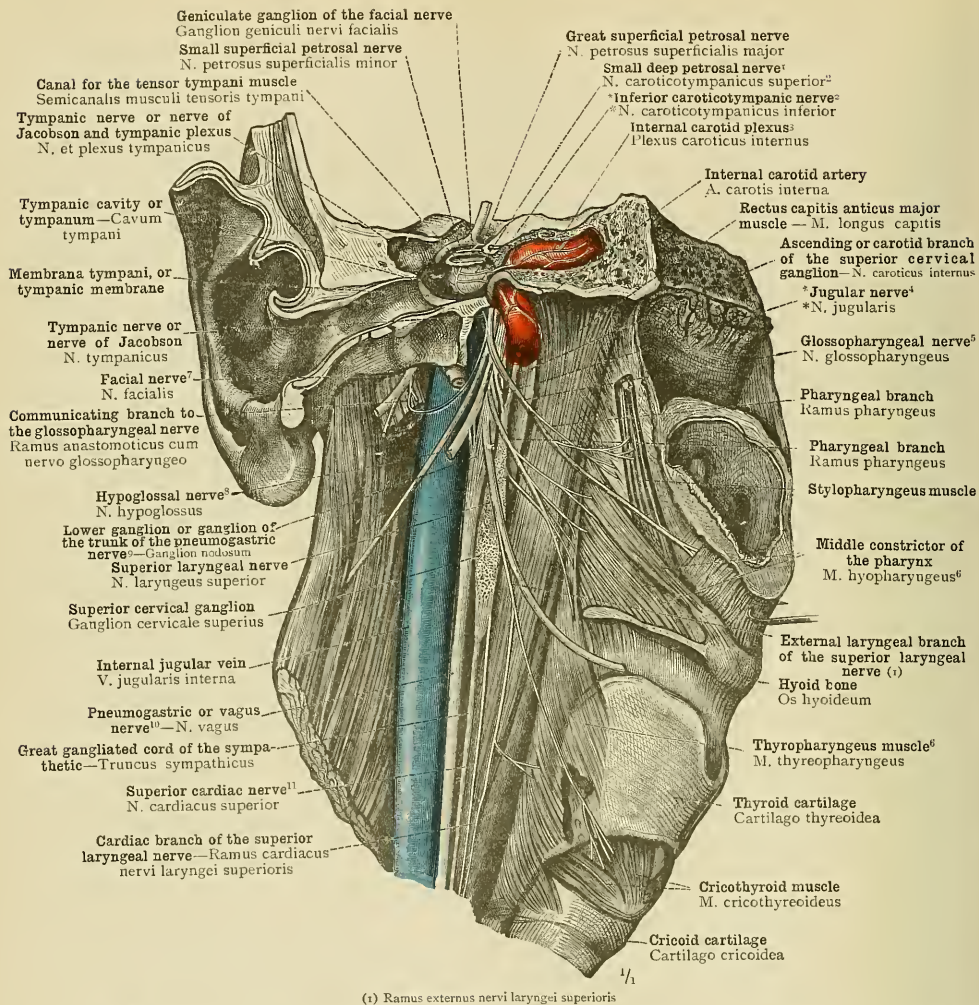


FIG. 1317.—THE GLOSSOPHARYNGEAL NERVE, N. GLOSSOPHARYNGEUS (see note ⁵ below); ITS COMMUNICATING BRANCH TO THE FACIAL NERVE, N. FACIALIS (see note ⁷ below); THE TYMPANIC NERVE (N. TYMPANICUS), TYMPANIC PLEXUS (PLEXUS TYMPANICUS), SMALL DEEP PETROSAL NERVE (N. CAROTICOTYMPANICUS SUPERIOR—see Appendix, note ⁴⁵³), *INFERIOR CAROTICOTYMPANIC NERVE (N. CAROTICOTYMPANICUS INFERIOR—see Appendix, note ⁴⁶⁸); THE BRANCHES OF THE GLOSSOPHARYNGEAL NERVE TO THE PHARYNX AND TO THE STYLOPHARYNGEUS MUSCLE. THE COMMUNICATION OF THE PNEUMOGASTRIC OR VAGUS NERVE, N. VAGUS (see note ¹⁰ below), WITH THE HYPOGLOSSAL NERVE, N. HYPOGLOSSUS (see note ⁸ below), AND WITH THE SYMPATHETIC NERVOUS SYSTEM, AND THE PHARYNGEAL AND LARYNGEAL BRANCHES OF THE PNEUMOGASTRIC NERVE.

On the right side of the head a saw-cut was made through the external auditory meatus, the tympanum, and the anterior wall of the carotid canal, and the basilar portion or process of the occipital bone was divided transversely. The pharynx and the soft palate were detached from the base of the skull, and the pharynx with the stylopharyngeus muscle and the larynx was drawn to the left.

¹ See Appendix, note 452.

² See Appendix, note 468.

³ See note 3 to p. 859.

⁴ See Appendix, note 462.

⁵ Ninth cranial nerve in Soemmerring's enumeration; first trunk of the eighth cranial nerve in that of Willis.

⁶ See Appendix, note 470.

⁷ Seventh cranial nerve in Soemmerring's enumeration; *fortio dura* of the seventh in that of Willis.

⁸ Twelfth cranial nerve in Soemmerring's enumeration, ninth in that of Willis; also known as the *lineal motor nerve*.

⁹ See note 5 to p. 872.

¹⁰ Tenth cranial nerve in Soemmerring's enumeration; second trunk of the eighth cranial nerve in that of Willis.

¹¹ Also called the *superficial cardiac nerve*.

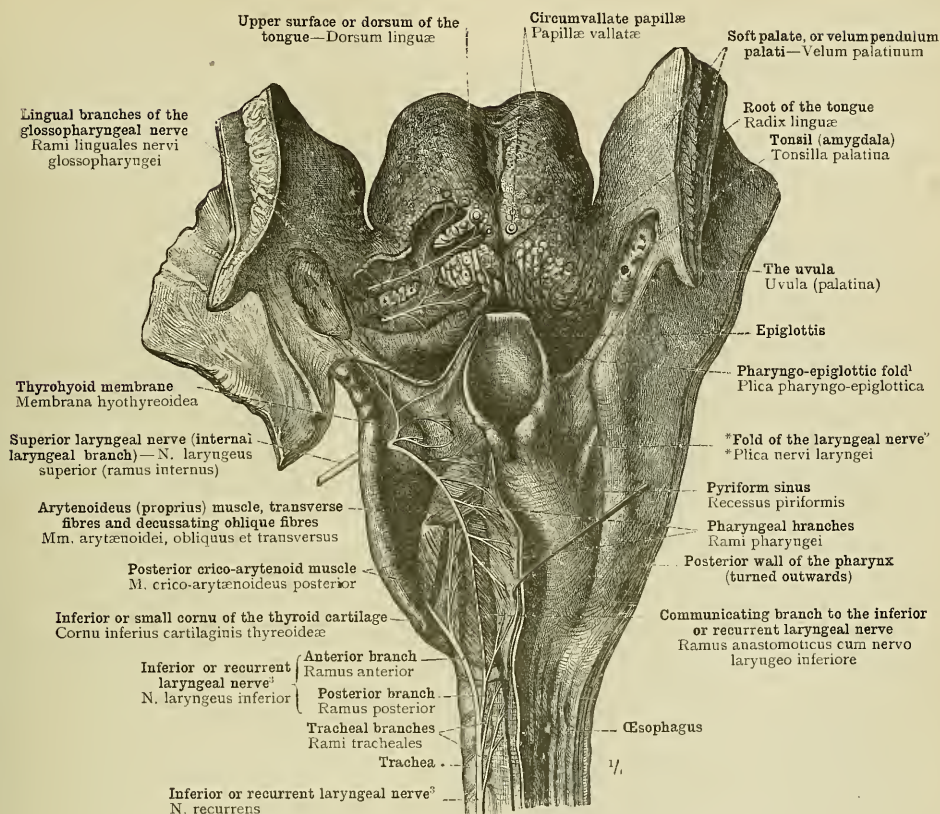
¹ See note 7 to p. 415, in Part IV.² See note 3 to p. 434, in Part IV.³ See Appendix, note 460.

FIG. 1318.—THE PERIPHERAL OFFSETS OF THE GLOSSOPHARYNGEAL NERVE, N. GLOSSOPHARYNGEUS, TO THE MUCOUS MEMBRANE OF THE ROOT OF THE TONGUE AND TO THE CIRCUMVALLATE PAPILLÆ. (THE BRANCHES OF THIS NERVE TO THE EDGE OF THE TONGUE ARE SHOWN IN FIG. 1324, p. 381.) THE OFFSETS OF THE INTERNAL LARYNGEAL BRANCH OF THE SUPERIOR LARYNGEAL NERVE, RAMUS INTERNUS NERVI LARYNGEI SUPERIORIS, TO THE MUCOUS MEMBRANE OF THE LARYNX AND THE PHARYNX, AND THE COMMUNICATING BRANCH TO THE INFERIOR OR RECURRENT LARYNGEAL NERVE, N. LARYNGEUS INFERIOR (see Appendix, note 462). SEEN FROM BEHIND.

The tongue, the soft palate, and the pharynx having been excised, the soft palate was divided by a median incision and its halves turned right and left. The branches of the glossopharyngeal nerve were exposed by the partial removal of the mucous membrane of the root of the tongue. In order to display the ramification of the superior laryngeal nerve, the mucous membrane of the pharynx was raised and turned inwards on the left side from the pharyngo-epiglottic fold above to the junction of the pharynx with the oesophagus below.

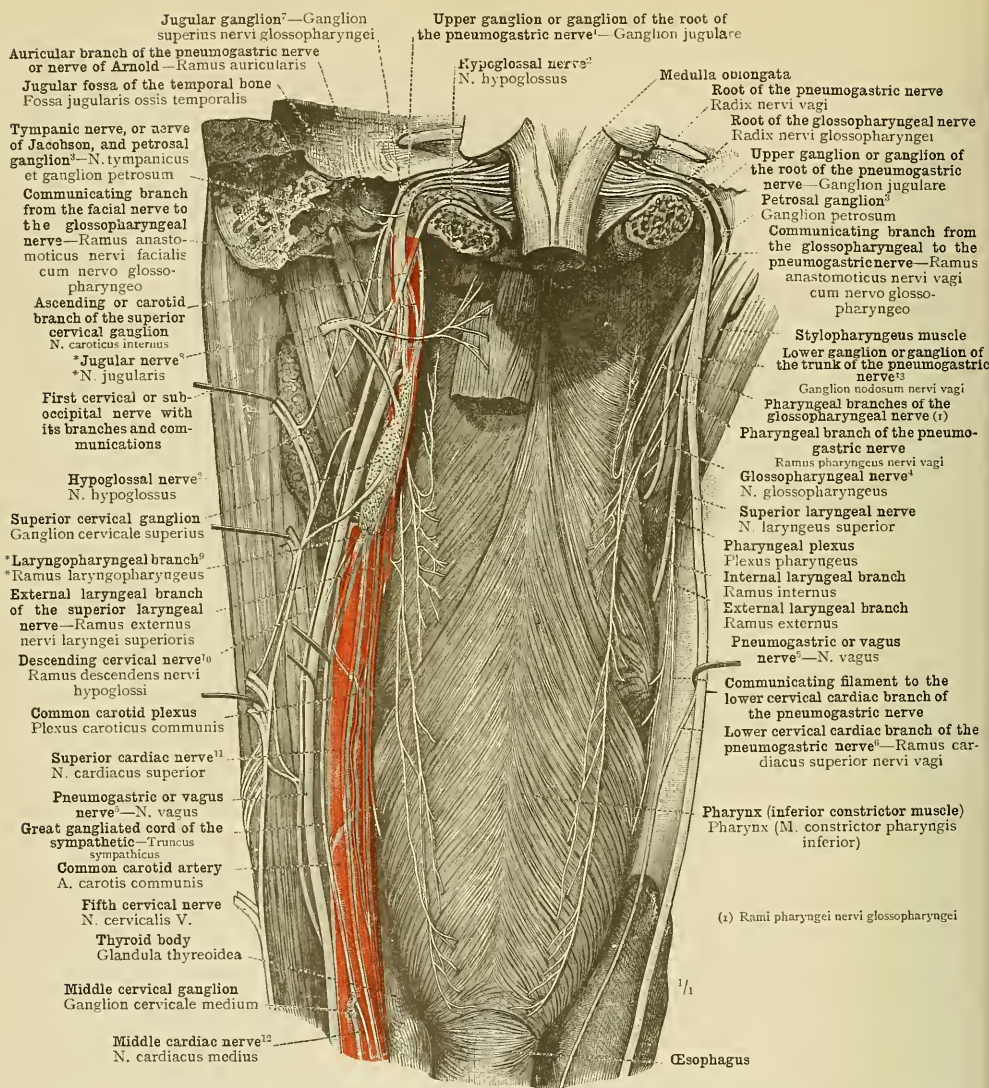


FIG. 1319.—THE CEPHALIC PORTION AND THE UPPER PART OF THE CERVICAL PORTION OF THE PNEUMOGASTRIC OR VAGUS NERVE, N. VAGUS, SEEN FROM BEHIND. ON THE LEFT SIDE THE COMMUNICATIONS OF THE PNEUMOGASTRIC NERVE WITH THE GLOSSOPHARYNGEAL NERVE, N. GLOSSOPHARYNGEUS, AND THE HYPOGLOSSAL NERVE, N. HYPOGLOSSUS, AS WELL AS THE COMMUNICATIONS OF THE SYMPATHETIC NERVOUS SYSTEM WITH THE NERVES JUST NAMED AND WITH THE UPPER CERVICAL NERVES, ARE DISPLAYED; ON THIS SIDE ALSO THE UPPER EXTREMITIES OF THE RECTUS CAPITIS ANTIUS MUSCLES, MAJOR AND MINOR, HAVE BEEN PRESERVED. ON THE RIGHT SIDE THE PNEUMOGASTRIC AND GLOSSOPHARYNGEAL NERVES ONLY, WITH THEIR PHARYNGEAL BRANCHES, RAMI PHARYNGEI, AND THE PHARYNGEAL PLEXUS, PLEXUS PHARYNGEUS, ARE DISPLAYED.

¹ See Appendix, note 447.

² Twelfth cranial nerve in Soemmerring's enumeration, ninth in that of Willis; also known as the lingual motor nerve.

³ Known also as Auderssch's ganglion.

⁴ Ninth cranial nerve in Soemmerring's enumeration; first trunk of the eighth cranial nerve in that of Willis.

⁵ Tenth cranial nerve in Soemmerring's enumeration; second trunk of the eighth cranial nerve in that of Willis.

⁶ See Appendix, note 425.

⁷ This name is used neither by Quain nor by Macalister.

⁸ Also called the superficial cardiac nerve.

⁹ See note 5 to p. 872.

¹⁰ See Appendix, note 420.

¹¹ Also called the great or deep cardiac nerve.

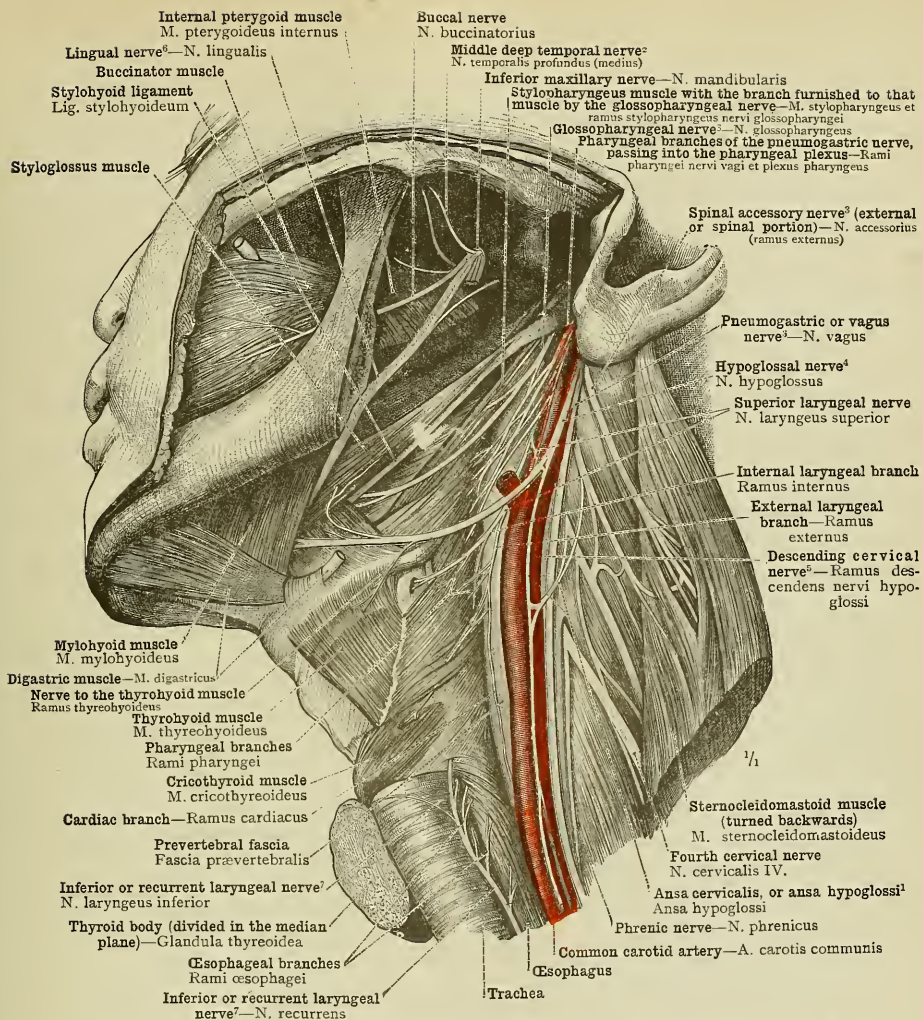


FIG. 1320.—THE HYPOGLOSSAL NERVE. N. HYPOGLOSSUS (see note ¹ below), DISPLAYED ON THE LEFT SIDE OF THE NECK; THE DESCENDING BRANCH, THE DESCENDING CERVICAL NERVE, RAMUS DESCENDENS NERVI HYPOGLOSSI (see Appendix, note ⁴²⁰), WITH THE ANSA CERVICALIS OR ANSA HYPOGLOSSI (see note ¹ below). WITH REGARD TO THE DISTRIBUTION OF THE DESCENDING CERVICAL NERVE, see Fig. 1249, p. 817; AND WITH REGARD TO THE TERMINAL EXPANSION OF THE HYPOGLOSSAL NERVE IN THE TONGUE, see Fig. 1325, p. 882. THE MUTUAL RELATIONS OF THE GLOSSOPHARYNGEAL NERVE, N. GLOSSOPHARYNGEUS, AND THE PNEUMOGASTRIC OR VAGUS NERVE, N. VAGUS (see note ³ below); THE PHARYNGEAL BRANCHES, RAMI PHARYNGEI, OF THESE NERVES, FORMING THE PHARYNGEAL PLEXUS, PLEXUS PHARYNGEUS. THE EXTERNAL OR SPINAL PORTION, RAMUS EXTERNUS, OF THE SPINAL ACCESSORY NERVE, N. ACCESSORIUS (see note ² below), AND ITS COMMUNICATION WITH THE SECOND AND THIRD CERVICAL NERVES. A PART OF THE RAMIFICATION OF THE INFERIOR MAXILLARY NERVE, N. MANDIBULARIS.

The posterior belly of the digastric muscle and the stylohyoid muscle have been removed, and the sternocleidomastoid muscle has been turned backwards.

¹ Also called *ansa infrahyoidea*. See Appendix, note ⁴²¹.

² In Fig. 1305, p. 865, the author shows *anterior and posterior deep temporal nerves* only, and these are the only *deep temporal* nerves mentioned in Von Langer and Todd's "Anatomy" (see Appendix, note ⁴²⁵). In this figure, however, a *middle deep temporal nerve* also is shown.

³ In Soemmerring's enumeration the *glossopharyngeal* is the *ninth cranial nerve*, the *pneumogastric* the *tenth*, and the *spinal accessory* the *eleventh*; in that of Willis they are respectively the *first*, *second*, and *third trunks* of the *eighteenth cranial nerve*.

⁴ *Fourth cranial nerve* in Soemmerring's enumeration, *ninth* in that of Willis; also known as the *lingual motor nerve*.

⁵ See Appendix, note ⁴²⁰.

⁶ Formerly known also as the *gustatory nerve*.

⁷ See Appendix, note ⁴²².

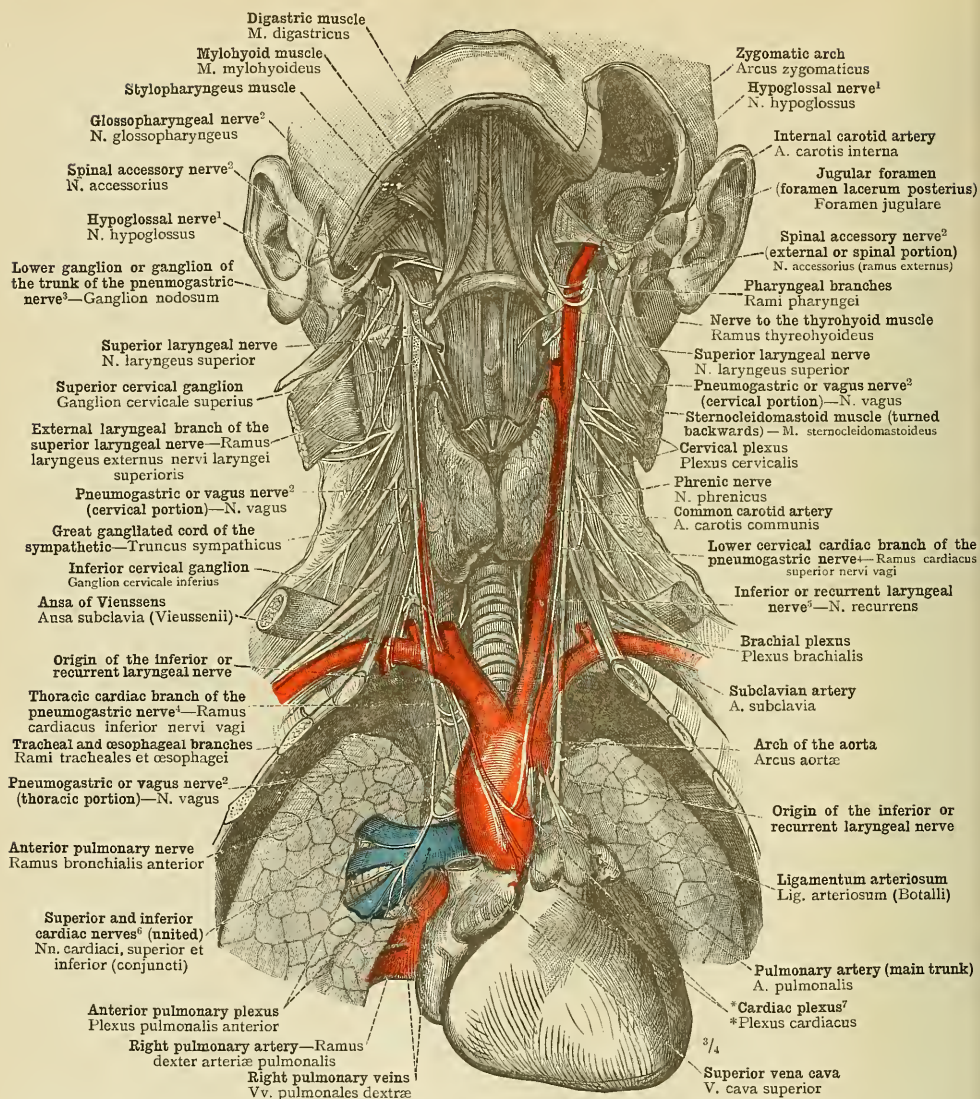


FIG. 1321.—THE CERVICAL PORTION AND THE UPPERMOST PART OF THE THORACIC PORTION OF THE PNEUMOGASTRIC OR VAGUS NERVE, N. VAGUS (see note ² below), SEEN FROM BEFORE; THE CARDIAC BRANCHES, RAMI CARDIACI, AND THE ANTERIOR PULMONARY BRANCH, RAMUS BRONCHIALIS ANTERIOR, OF THIS NERVE. THE ORIGIN OF THE INFERIOR OR RECURRENT LARYNGEAL NERVE, N. RECURRENS (see Appendix, note ⁴⁰²) FROM THE PNEUMOGASTRIC TRUNK. ON THE RIGHT SIDE OF THE BODY THE GREAT GANGLIATED CORD OF THE SYMPATHETIC IS ALSO DISPLAYED.

The head is bent strongly backwards.

¹ Twelfth cranial nerve in Soemmerring's enumeration, ninth in that of Willis; also known as the lingual motor nerve.

² In Soemmerring's enumeration the glossopharyngeal nerve is the ninth cranial nerve, the pneumogastric the tenth, and the spinal accessory the eleventh; in that of Willis they are respectively the first, second, and third trunks of the eighth cranial nerve.

³ See note 3 to p. 872.

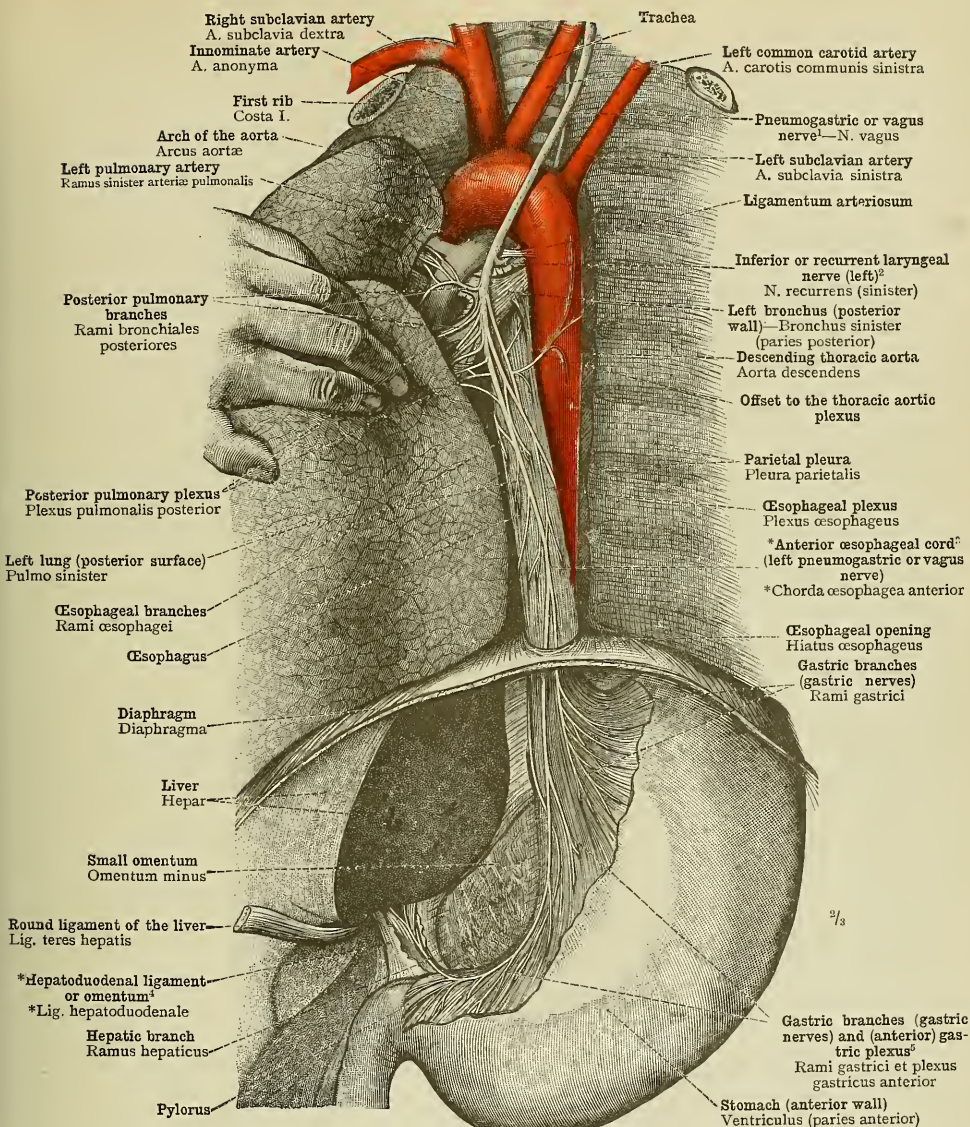
⁴ See Appendix, note 402.

⁵ See Appendix, note 402.

⁶ The superior cardiac nerve is known also as the superficial cardiac, and the middle cardiac as the deep or great cardiac nerves.

⁷ See Appendix, note 404.

Vagus Group.



¹ Tenth cranial nerve in Soemmerring's enumeration; second trunk of the eighth cranial nerve in that of Willis.

² See Appendix, note ⁴⁶².

³ See Appendix, note ⁴⁶⁴.

⁴ See Appendix to Part IV., note ⁴⁷.

FIG. 1322.—THE THORACIC PORTION OF THE LEFT PNEUMOGASTRIC OR VAGUS NERVE, N. VAGUS (see note ¹ above), SEEN FROM BEFORE. THE POSTERIOR PULMONARY BRANCHES, RAMI BRONCHIALES POSTERIORES, THE OESOPHAGEAL PLEXUS, PLEXUS OESOPHAGEUS, AND THE RAMIFICATION OF THE *ANTERIOR OESOPHAGEAL CORD (LEFT PNEUMOGASTRIC OR VAGUS NERVE), *CHORDA OESOPHAGEA ANTERIOR (see Appendix, note ⁴⁶⁴), ON THE ANTERIOR WALL OF THE STOMACH. (COMPARE WITH THIS FIGURE FIG. 1315, p. 872.)

The left lung has been drawn out of the thoracic cavity and turned to the right.

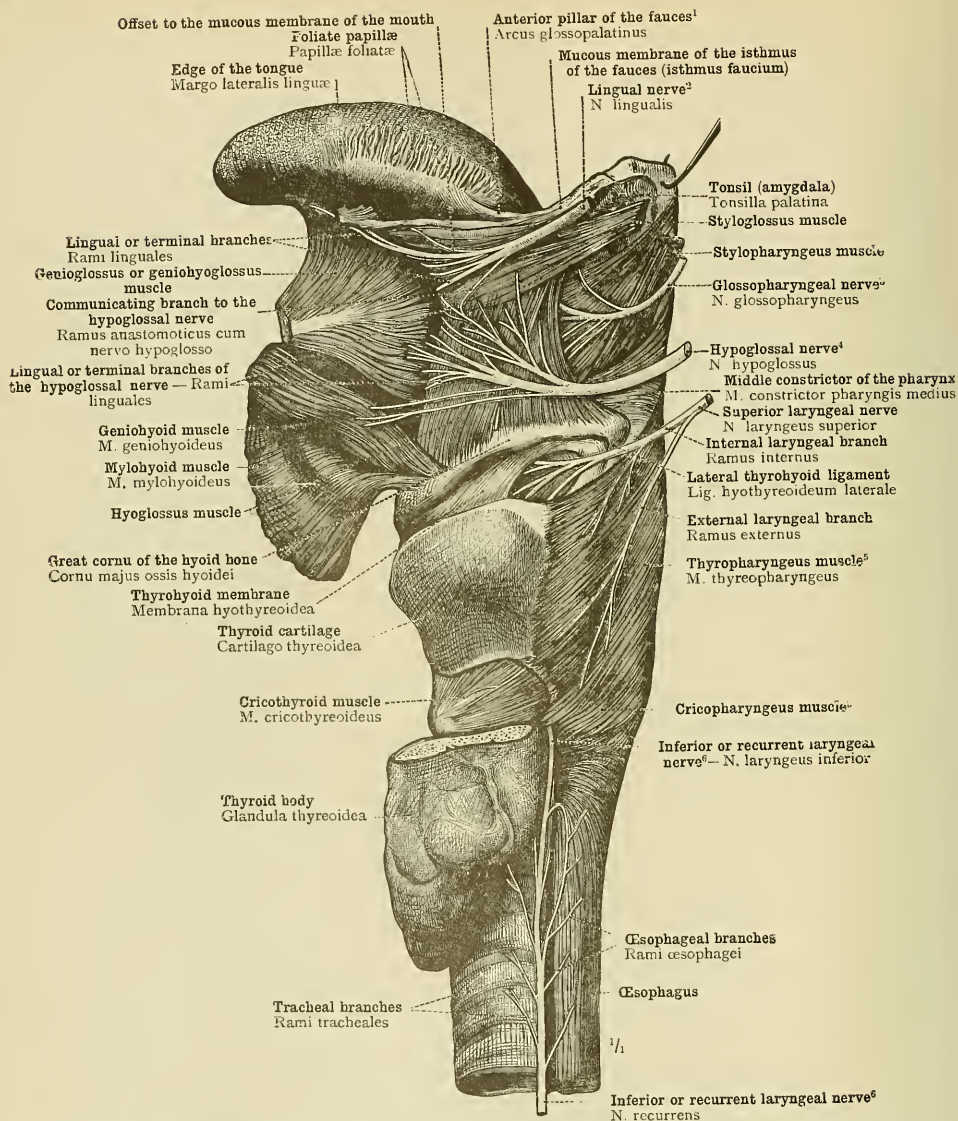


FIG. 1323.—THE DISTRIBUTION OF THE LINGUAL NERVE, N. LINGUALIS (see note ² below), THE GLOSSOPHARYNGEAL NERVE, N. GLOSSOPHARYNGEUS (see note ³ below), AND THE HYPOGLOSSAL NERVE, N. HYPOGLOSSUS (see note ⁴ below), ALSO OF THE SUPERIOR LARYNGEAL NERVE, N. LARYNGEUS SUPERIOR, AND THE INFERIOR OR RECURRENT LARYNGEAL NERVE, N. RECURRENS (see Appendix, note ⁶), AS SEEN FROM THE LEFT SIDE ON THE OUTER SURFACE OF THE ISOLATED CEPHALIC AND CERVICAL VISCERA.

In order to lay bare the cricothyroid muscle, musculus cricothyroideus, and the nerve to the cricothyroid muscle, the upper half of the left lateral lobe of the thyroid body was cut away.

¹ Known also as the anterior palatine, or glossopalatine, arch.

² Formerly known also as the gustatory nerve.

³ Ninth cranial nerve in Soemmering's enumeration; first trunk of the eighth cranial nerve in that of Willis.

⁴ Twelfth cranial nerve in Soemmering's enumeration; ninth in that of Willis; also known as the lingual motor nerve.

⁵ The thyropharyngeus muscle is the upper part, the cricopharyngeus muscle the lower part, of the inferior constrictor of the pharynx. See Fig. 706, p. 433, in Part IV.

⁶ See Appendix, note ⁴⁶.

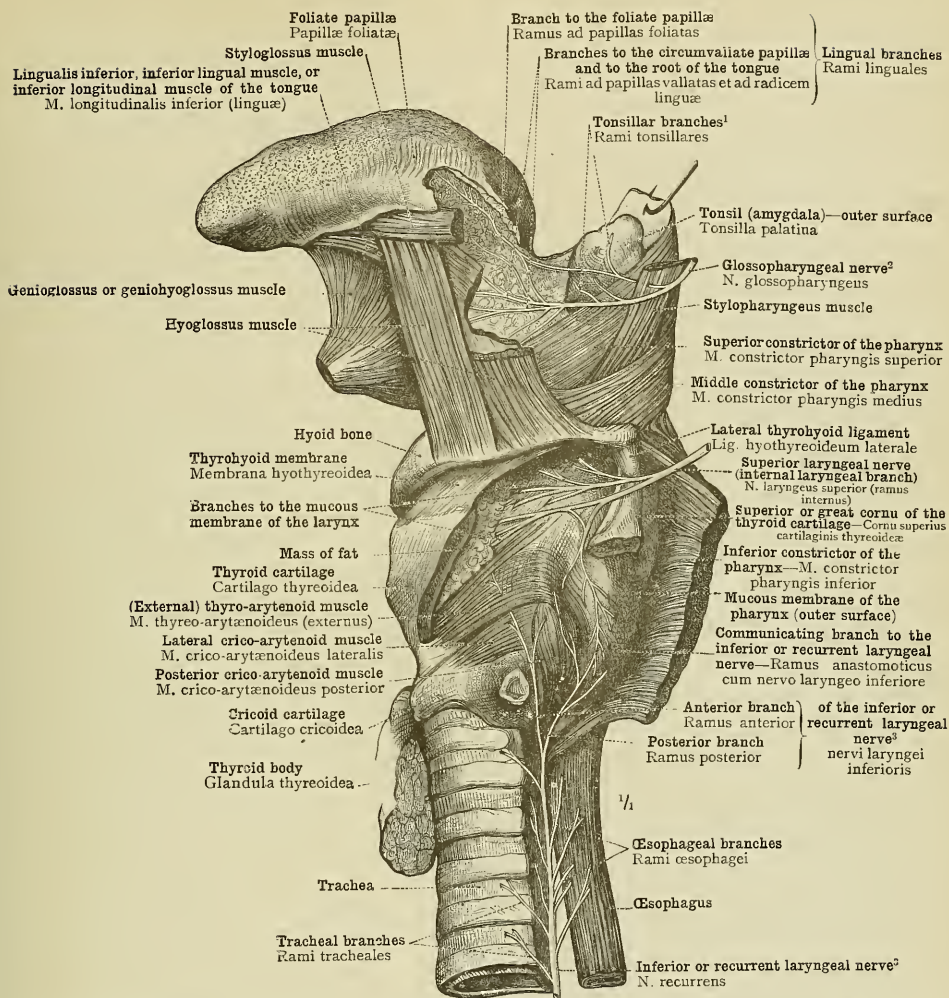


FIG. 1324.—THE TERMINAL RAMIFICATION OF THE GLOSSOPHARYNGEAL NERVE, N. GLOSSOPHARYNGEUS (see note ² below) IN THE REGION OF THE ISTHMUS OF THE FAUCES, ISTHMUS FAUCIUM, ON THE OUTER SURFACE OF THE TONSIL (TONSILLA PALATINA), AND ON THE EDGE OF THE TONGUE, MARGO LATERALIS LINGUÆ. THE DISTRIBUTION OF THE SUPERIOR LARYNGEAL NERVE, N. LARYNGEUS SUPERIOR, AND THE INFERIOR OR RECURRENT LARYNGEAL NERVE, N. LARYNGEUS INFERIOR (see Appendix, note ⁴⁶²), TO THE LARYNX AND THE PHARYNX, DISPLAYED BY THE REMOVAL OF THE GREATER PART OF THE LEFT ALA OF THE THYROID CARTILAGE AND OF THE INFERIOR CONSTRICTOR OF THE PHARYNX, M. CONSTRICTOR PHARYNGIS INFERIOR. SEEN FROM THE LEFT SIDE. (FIGURE 1318 SHOULD BE COMPARED WITH THIS FIGURE.)

¹ Quain speaks of the *tonsillitic branches* of the glossopharyngeal nerve. The adjectival form *tonsillar*, which is used by the same author of the arteries of the tonsil, is to be preferred, and is used in the text.

² Ninth cranial nerve in Soemmering's enumeration; first trunk of the eighth cranial nerve in that of Willis.

³ See Appendix, note ⁴⁶².

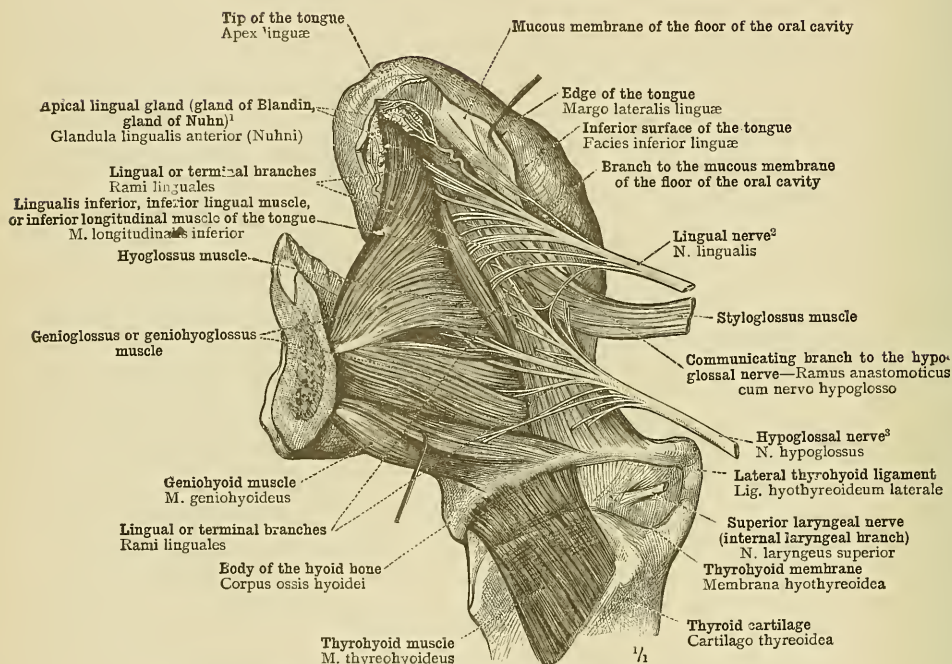
¹ See note ² to p. 420, in Part IV.² Formerly known also as the *gustatory nerve*.³ *Twelfth cranial nerve* in Soemmerring's enumeration, *ninth* in that of Willis; also known as the *lingual motor nerve*.

FIG. 1325.—THE RAMIFICATION OF THE HYPOGLOSSAL NERVE, N. HYPOGLOSSUS (see note ³ above), AND THE LINGUAL NERVE, N. LINGUALIS (see note ² above), IN THE TONGUE, AND THE COMMUNICATIONS BETWEEN THESE TWO NERVES, SEEN OBLIQUELY FROM BELOW AND THE LEFT SIDE. THE ENTRANCE OF THE INTERNAL LARYNGEAL BRANCH OF THE SUPERIOR LARYNGEAL NERVE, RAMUS INTERNUS NERVI LARYNGEI SUPERIORIS, INTO THE LARYNX THROUGH THE THYROHYOID MEMBRANE, MEMBRANA HYOTHYROIDEA.

SYSTEMA NERVORUM
SYMPATHICUM

THE
SYMPATHETIC NERVOUS SYSTEM

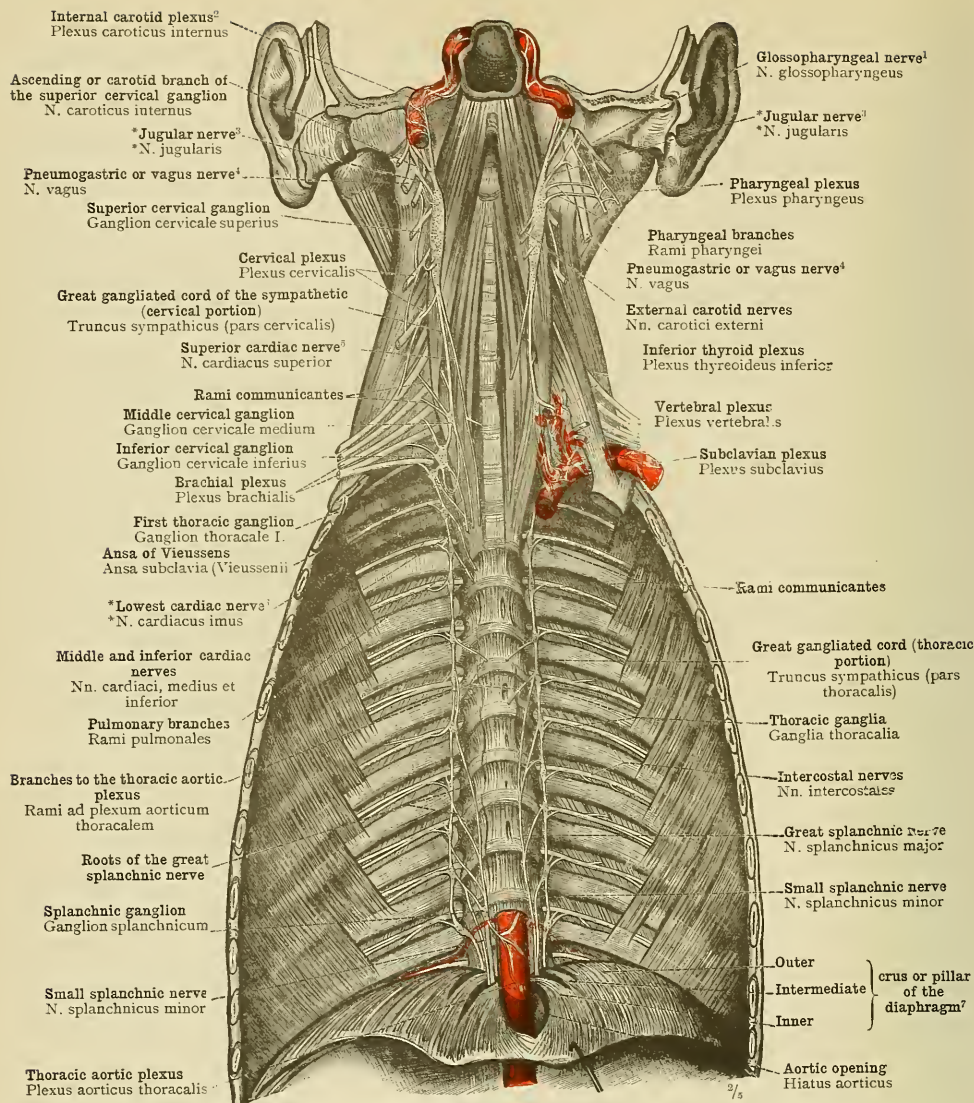


FIG. 1326.—CERVICAL PORTION, PARS CERVICALIS, AND THORACIC PORTION, PARS THORACALIS, OF THE GREAT GANGLIATED CORD OF THE SYMPATHETIC, WITH ITS GANGLIA (VERTEBRAL OR LATERAL GANGLIA OF GASKELL), GANGLIA TRUNCI SYMPATHICI; ITS CONTINUITY WITH THE INTERNAL CAROTID PLEXUS, PLEXUS CAROTICUS INTERNUS (see note ³ to p. 859), ITS COMMUNICATIONS WITH THE CEREBROSPINAL NERVES, AND ITS BRANCHES OF DISTRIBUTION. SEEN FROM BEFORE.

¹ Ninth cranial nerve in Soemmerring's enumeration; first trunk of the eighth cranial nerve in that of Willis.

² See note 3 to p. 859.

³ See Appendix, note 469.

⁴ Tenth cranial nerve in Soemmerring's enumeration; second trunk of the eighth cranial nerve in that of Willis.

⁵ Also known as the superficial cardiac nerve.

⁶ See Appendix, note 472.

⁷ See note 1 to p. 286, in Part III.

Truncus sympathicus—Great gangliated cord of the sympathetic.

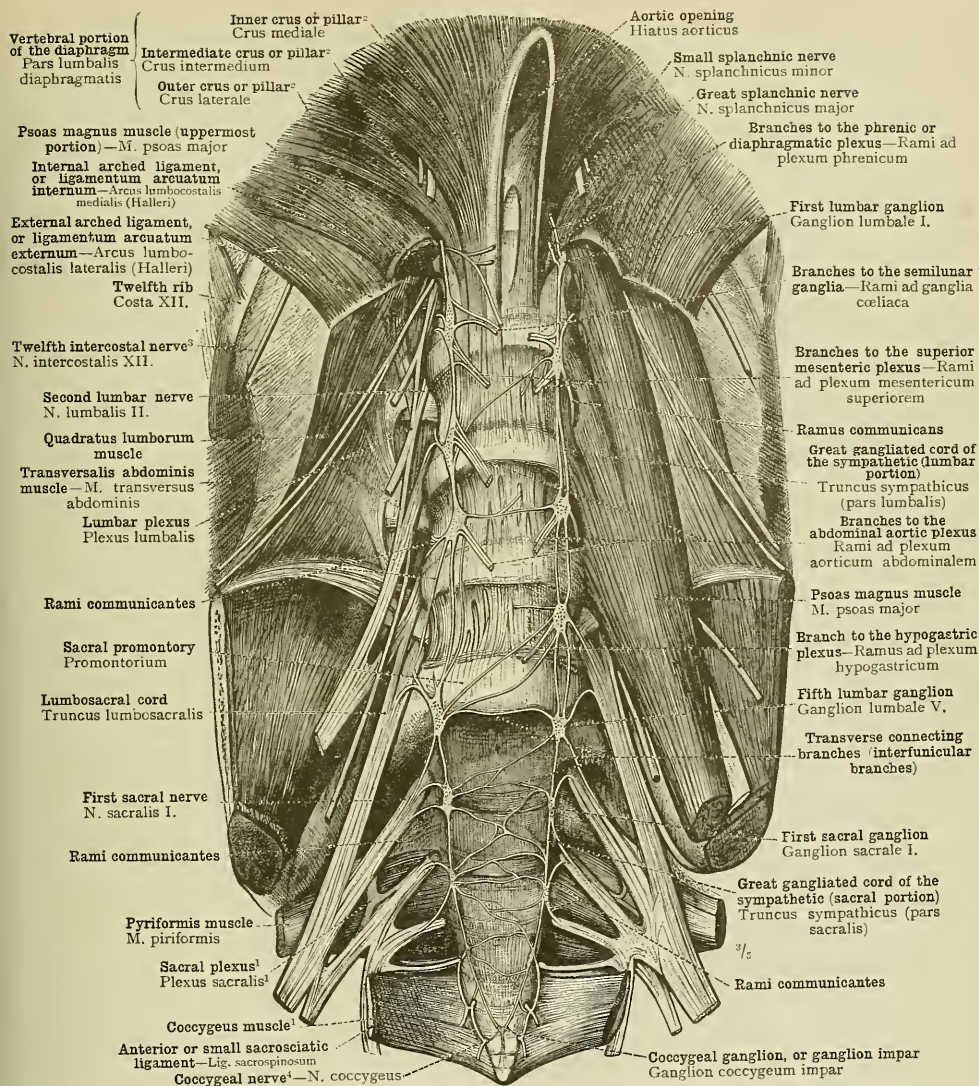


FIG. 1327.—LUMBAR PORTION, PARS LUMBALIS, AND SACRAL PORTION, PARS SACRALIS, OF THE GREAT GANGLIATED CORD OF THE SYMPATHETIC, WITH ITS GANGLIA (VERTEBRAL OR LATERAL GANGLIA OF GASKELL), GANGLIA TRUNCI SYMPATHICI; ITS COMMUNICATIONS WITH THE SPINAL NERVES, AND ITS BRANCHES OF DISTRIBUTION. SEEN FROM BEFORE.

On the right side of the body the psoas magnus muscle, musculus psoas major, has been removed, in order to lay bare the lumbar plexus, plexus lumbalis, and the rami communicantes of the lumbar portion of the great gangliated cord of the sympathetic.

¹ The nervous plexus denoted here by the term *plexus sacralis* is by some English authors called the *sciatic plexus*, the *sacral plexus* according to these anatomists comprising both the *plexus sacralis* and *plexus pudendus* of Tolot. See Appendix, note 43^b.

² See note ¹ to p. 285, in Part III.

³ Also known as the *subcostal nerve*.

⁴ See Appendix, note 43^a.

Truncus sympathicus—Great gangliated cord of the sympathetic.

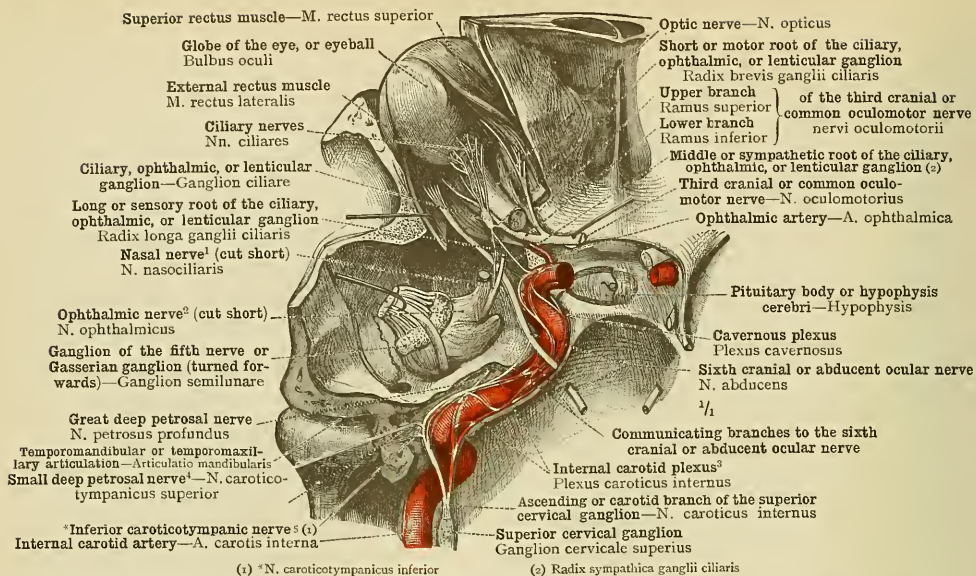


FIG. 1328.—THE CEPHALIC PORTION, PARS CEPHALICA, OF THE SYMPATHETIC NERVOUS SYSTEM. SEEN OBliquely FROM ABOVE AND BEHIND.

The carotid canal, canalis caroticus, and the cavernous sinus, sinus cavernosus, have been opened throughout, and the outer wall and also a part of the upper wall of the left orbit have been cut away. The ganglion of the fifth cranial nerve or Gasserian ganglion, ganglion semilunare (Gasseri), has been turned forwards.

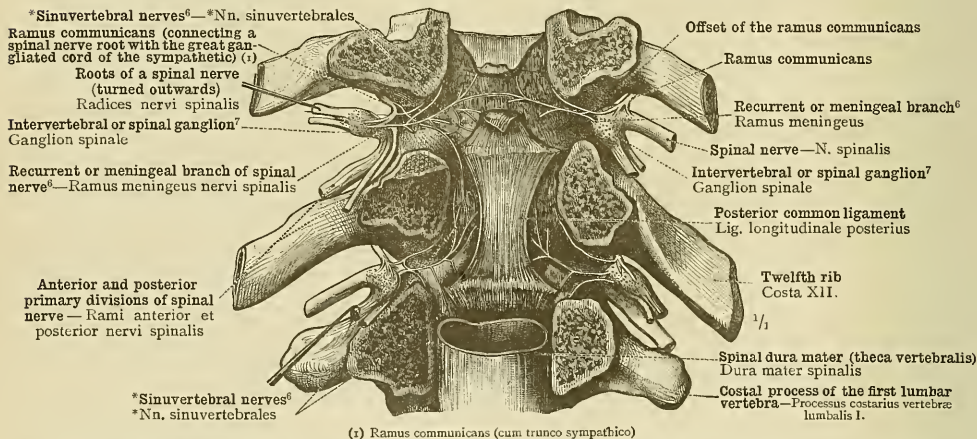


FIG. 1329.—THE NERVES OF THE SPINAL OR NEURAL CANAL (INTRASPINAL NERVES, *SINUVERTEBRAL NERVES, *NERVI SINUVERTEBRALES—see Appendix, note 473), AS SEEN ON THE POSTERIOR SURFACE OF THE BODIES OF THE ELEVENTH AND TWELFTH DORSAL VERTEBRÆ WHEN THE NEURAL ARCHES HAVE BEEN CUT AWAY AND THE SPINAL CORD REMOVED FROM BEHIND.

The roots of the spinal nerves with the intervertebral or spinal ganglia (ganglia of the posterior root) have been turned outwards.

¹ Also known as the *oculonasal* and as the *nasociliary* nerve.

² Or first division of the fifth cranial, trifacial, or trigeminal nerve.

³ See Appendix, notes 425 and 426. ⁵ See Appendix, note 468.

⁷ Also called the *ganglion of the posterior root*.

³ See note 3 to p. 859.

⁶ See Appendix, note 473.

Pars cephalica systematis sympathici—The cephalic portion of the sympathetic nervous system,—*Nervi sinuvertebrales—The *sinuvertebral (intraspinal) nerves.

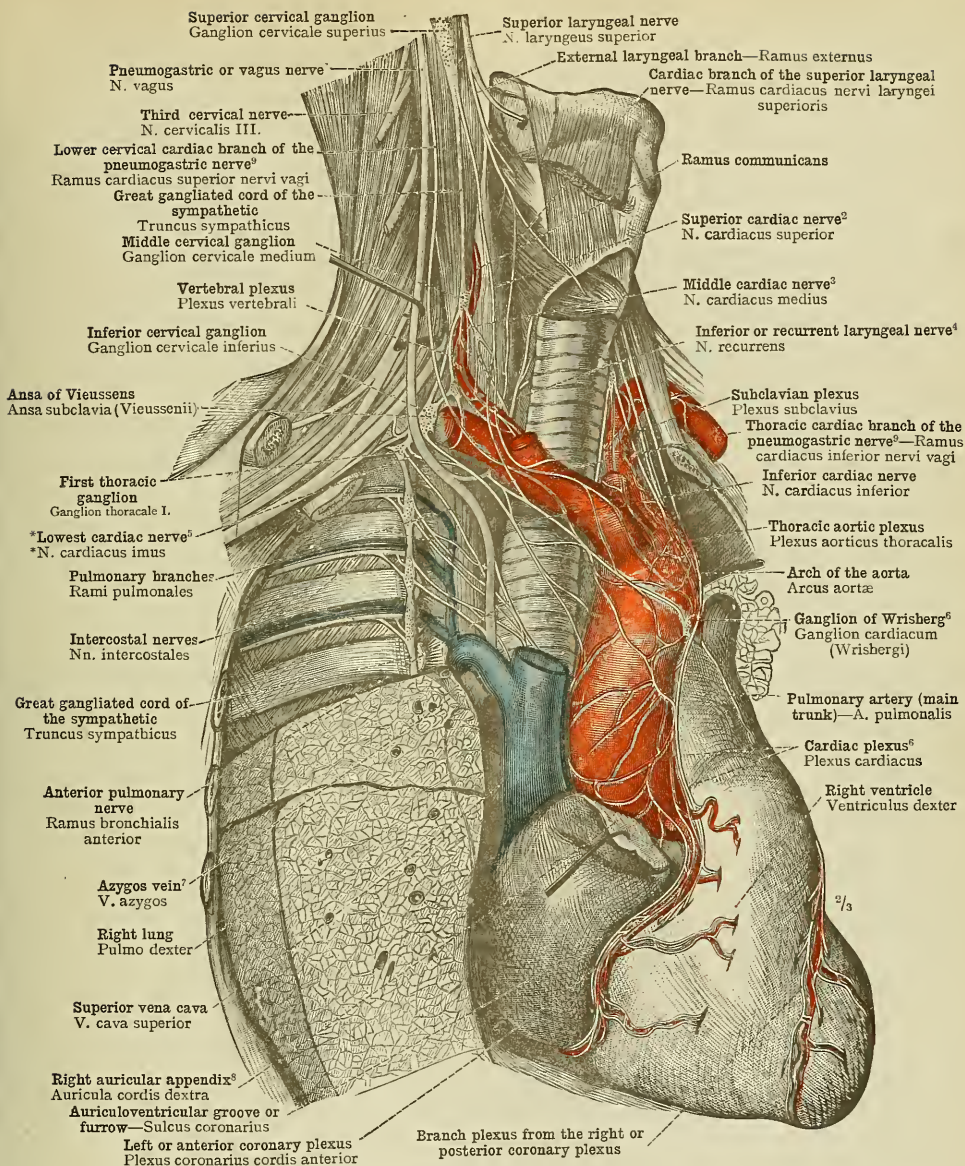


FIG. 1330.—THE CARDIAC NERVES, NN. CARDIACI, AND THE CARDIAC PLEXUS, PLEXUS CARDIACUS (see *Appendix*, note 411), SEEN FROM THE RIGHT SIDE.

The anterior and upper portions of the right lung have been cut away.

¹ Tenth cranial nerve in Soemmerring's enumeration; second trunk of the eighth cranial nerve in that of Willis.

² Also known as the *superficial cardiac nerve*.

³ Also known as the *deep or great cardiac nerve*.

⁴ See *Appendix*, note 422.

⁵ See *Appendix*, note 422.

⁶ See *Appendix*, note 422.

⁷ Also called the *right or large azygos vein*.

⁸ See *Appendix* to Part V., note 113.

⁹ See *Appendix*, note 422.

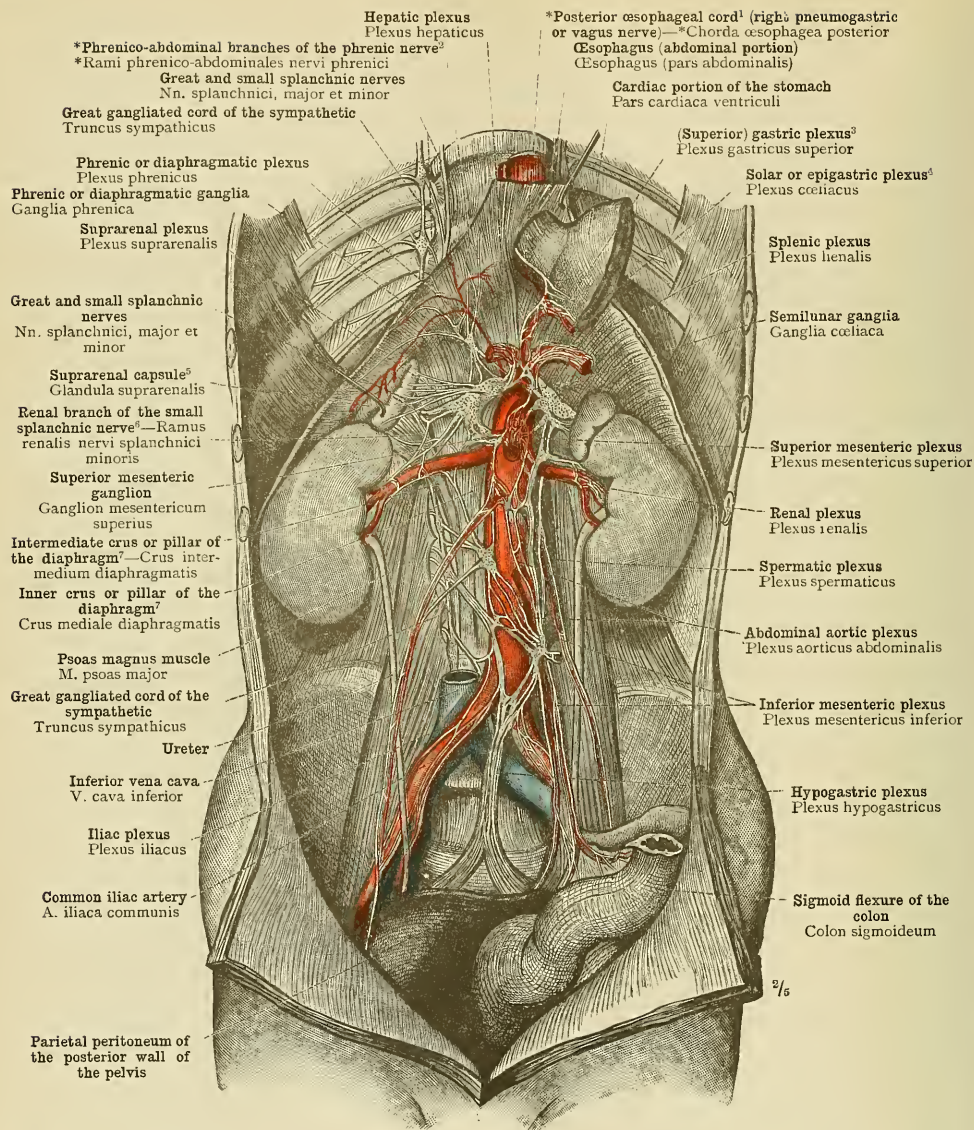


FIG. 1331.—THE GANGLIA OF THE PLEXUSES OF THE SYMPATHETIC (PREVERTEBRAL OR COLLATERAL GANGLIA OF GASKELL), GANGLIA PLEXUUM SYMPATHICORUM, AND THE FORMATION OF THE PLEXUSES OF THE SYMPATHETIC, PLEXUS SYMPATHICI, IN THE RETROPERITONEAL SPACE. SEEN FROM BEFORE.

¹ See Appendix, note 464.

² See Appendix, note 474.

³ See Appendix, note 465.

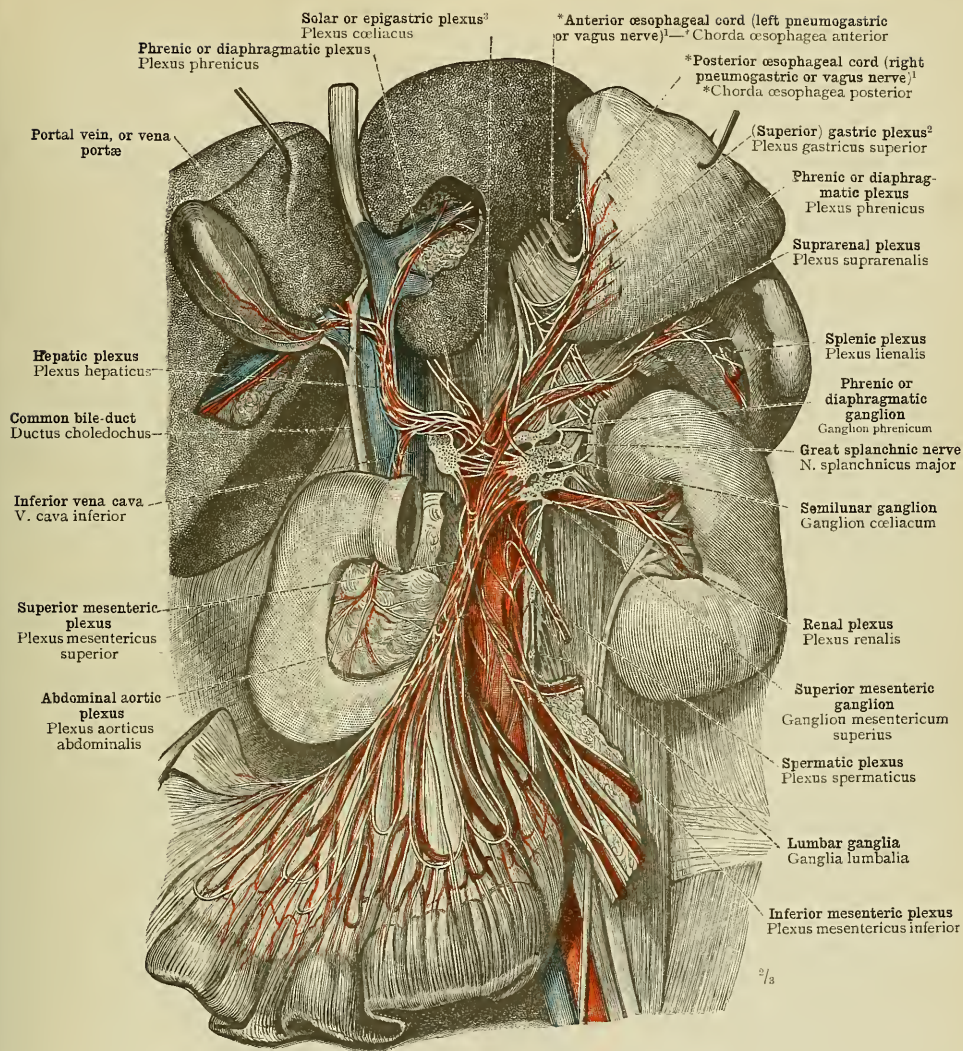
⁴ See Appendix, note 474.

⁵ Called also *suprarenal body*, or *adrenal*.

⁶ See Appendix, note 475.

⁷ See note ¹ to p. 286, in Part III.

Pars abdominalis systematis sympathici—Abdominal portion of the sympathetic nervous system.



¹ See Appendix, note 464.

² See Appendix, note 465.

³ See Appendix, note 474.

FIG. 1332.—THE SEMILUNAR GANGLIA, GANGLIA CÆLIACA, WITH THE SYMPATHETIC PLEXUSES, PLEXUS SYMPATHICI, OF THE ABDOMINAL VISCERA, RADIATING FROM THESE GANGLIA.

The uppermost portion only of the stomach has been retained, in connexion with the œsophagus, and this portion, together with the liver, has been turned upwards. The pancreas was cut across at the junction of the head and the body (*i.e.*, the neck of the organ, according to English writers—see Fig. 720, p. 441, in Part IV.), and the body of the gland was removed. The arteries and nerves of the mesentery have been exposed by the removal of the peritoneum covering them.

Pars abdominalis systematis sympathici—Abdominal portion of the sympathetic nervous system.

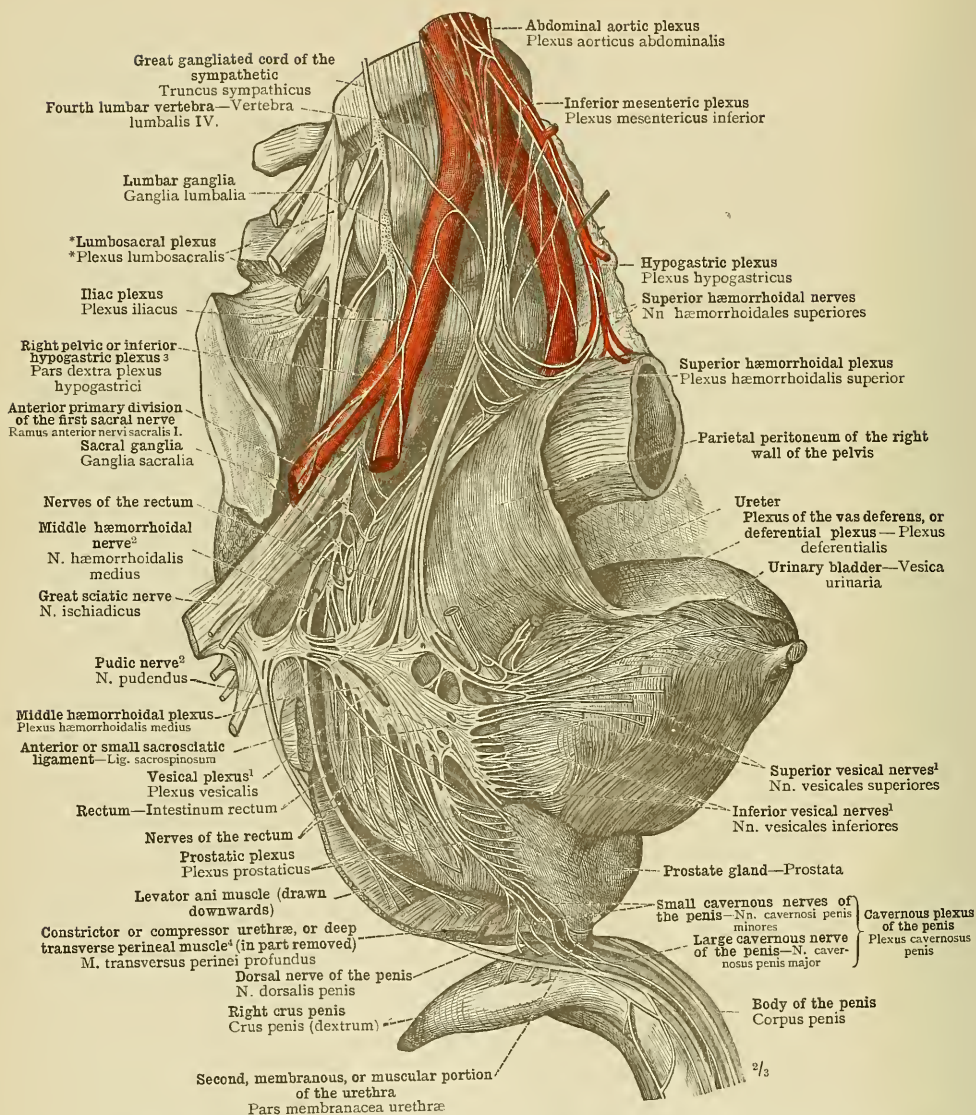
¹ See Appendix, note 476.² See Appendix, note 438.³ See Appendix, note 477.⁴ See note 2 to p. 527, in Part IV.

FIG. 1333.—THE HYPogastric and PELVIC PLEXUSES, PLEXUS HYPogastricus (see Appendix, note 477), THE PARENT PLEXUSES FROM WHICH THE SYMPATHETIC PLEXUSES OF THE PELVIC VISCERA ARE DERIVED, AND THE SHARE TAKEN BY THE SACRAL PORTION OF THE GREAT SYMPATHETIC CORD IN THEIR FORMATION. THE PUDIC PLEXUS, PLEXUS PUDENDUS (see Appendix, note 438).

Pars pelvina systematis sympathici—Pelvic portion of the sympathetic nervous system.

ORGANA SENSUUM
THE ORGANS OF THE SENSES

ORGANON VISUS

THE EYE

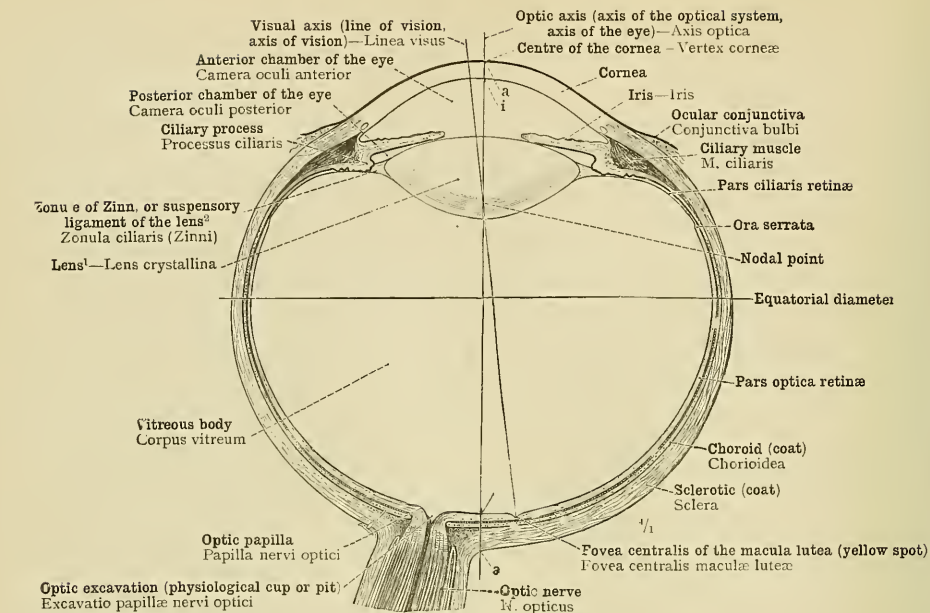


FIG. 1334.—DIAGRAM OF A HORIZONTAL SECTION OF THE RIGHT EYE. VISUAL AXIS, *LINEA VISUS*; OPTIC AXIS, *AXIS OPTICA*; aa, EXTERNAL AXIS OF THE EYE, *AXIS OCULI EXTERNA*; ii, INTERNAL AXIS OF THE EYE, *AXIS OCULI INTERNA*.

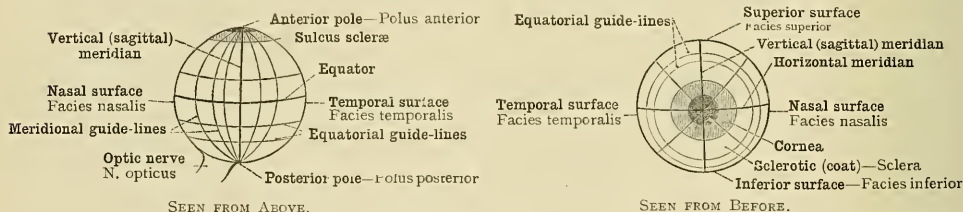


FIG. 1335.—TERMS COMMONLY EMPLOYED IN THE ORIENTATION OF THE EYEBALL. RIGHT EYE.

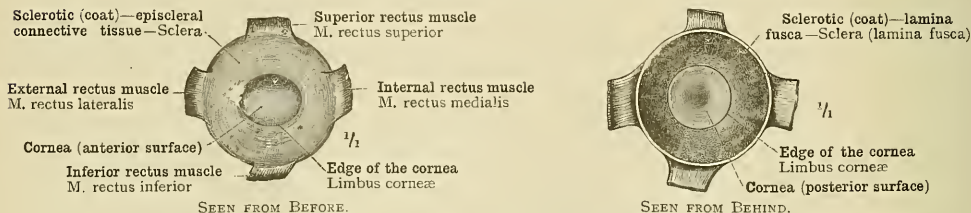


FIG. 1336.—THE ANTERIOR HEMISPHERE OF THE EXTERNAL FIBROUS COAT OF THE EYEBALL, *TUNICA FIBROSA OCULI*, CONSISTING OF TWO PARTS: THE SCLEROTIC (COAT), (*TUNICA*) *SCLERA*, AND THE CORNEA.

¹ In full known as the *crystalline lens*, but more commonly spoken of as the *lens* without the qualifying adjective.

² See Appendix, note 489.

Bulbus oculi—The globe of the eye, or eyeball.—**Tunica fibrosa oculi**—The external fibrous coat of the eyeball.

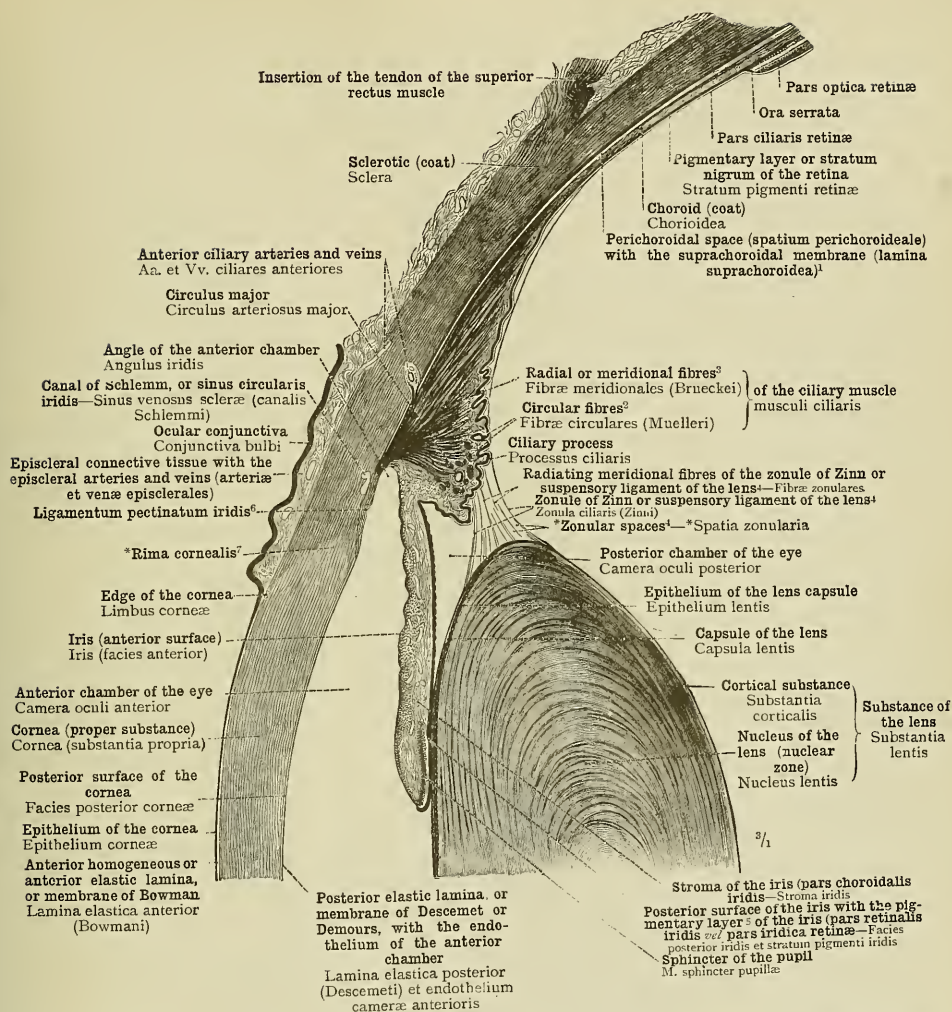


FIG. 1337.—THE UPPER HALF OF A SAGITTAL SECTION THROUGH THE FRONT OF THE EYEBALL. THE LAYERS OF THE THREE COATS OF THE EYEBALL; THE ANTERIOR AND POSTERIOR CHAMBERS, CAMERA OCULI ANTERIOR ET CAMERA OCULI POSTERIOR. THE RELATIONS OF THE LENS, LENS CRYSTALLINA, TO THE CILIARY BODY, CORPUS CILIARE, AND TO THE IRIS. THE CILIARY MUSCLE, M. CILIARIS, AND THE ZONULE OF ZINN OR SUSPENSORY LIGAMENT OF THE LENS, ZONULA CILIARIS ZINNI (see Appendix, note 480).

¹ See Appendix, note 478.
⁴ See Appendix, note 480.

² See Appendix, note 479.

³ Constituting what is sometimes called the radial ciliary muscle (Macalister, *op. cit.*, p. 670).
⁶ Sometimes called the pillars of the iris.

⁵ Also called the *weal pigment* of the iris.

⁷ See Appendix, note 481.

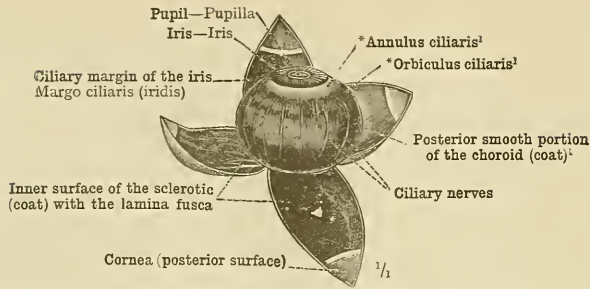


FIG. 1338.—THE MIDDLE OR VASCULAR COAT OF THE EYEBALL, *TUNICA UVEA seu VASCULOSA OCULI*, EXPOSED FROM WITHOUT; ITS TWO PORTIONS, THE IRIS AND THE CHOROID (COAT), CHORIOIDEA. LEFT EYE, SEEN OBLIQUELY FROM ABOVE AND BEFORE.

The external coat of the eyeball was divided into four segments by meridional incisions extending backwards as far as the entrance of the optic nerve into the globe, and these segments were turned backwards.

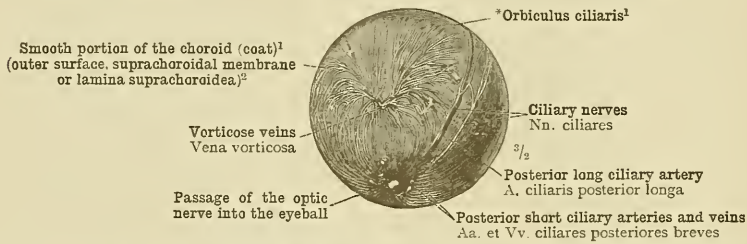


FIG. 1339.—THE POSTERIOR PORTION OF THE CHOROID (COAT), DISPLAYED FROM WITHOUT BY THE COMPLETE REMOVAL OF THE EXTERNAL COAT OF THE EYEBALL. RIGHT EYE, SEEN FROM ABOVE AND BEHIND, WITH THE TEMPORAL SURFACE OF THE EYEBALL ROTATED A LITTLE UPWARDS.

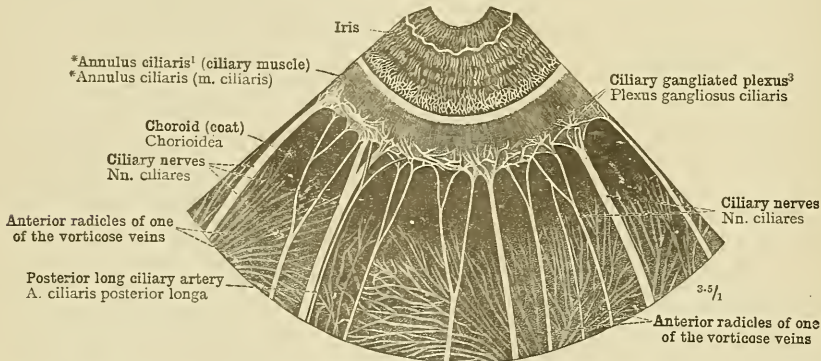


FIG. 1340.—THE CILIARY GANGLIATED PLEXUS (see Appendix, note 482), PLEXUS GANGLIOSUS CILIARIS, AND THE CILIARY NERVES ENTERING THIS PLEXUS. OUTER SURFACE OF THE MIDDLE OR VASCULAR COAT OF THE EYEBALL.

¹ See Appendix, note 482.

² See Appendix, note 478.

³ See Appendix, note 483.

Tunica vasculosa seu uvea oculi—The middle or vascular coat of the eyeball.

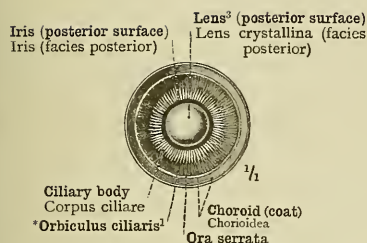


FIG. 1341.—THE INNER SURFACE OF THE ANTERIOR PORTION OF THE CHOROID (COAT), WITH THE LENS. THE CORONA CILIARIS (see Appendix, note 485). SEEN FROM BEHIND.

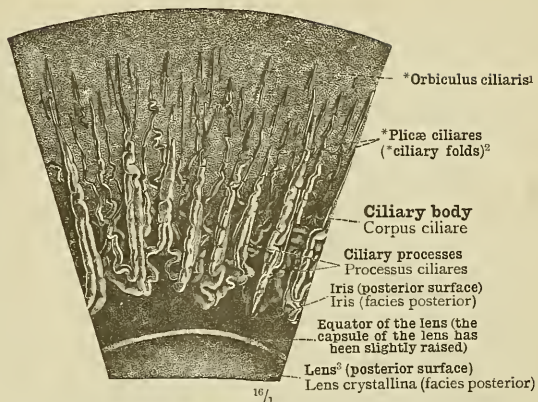


FIG. 1342.—A PORTION OF THE CORONA CILIARIS (see Appendix, note 485), MAGNIFIED. THE CILIARY PROCESSES, PROCESSUS CILIARES, AND THE *CILIARY FOLDS, *PLICE CILIARES (see Appendix, note 485).

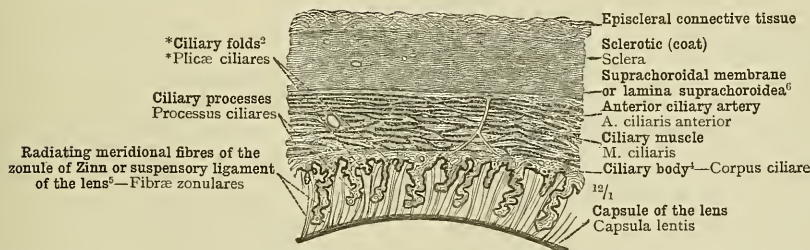


FIG. 1343.—A PORTION OF A CORONAL SECTION THROUGH THE CILIARY BODY, CORPUS CILIARE, AND THE SCLEROTIC (COAT), SCLERA. THE CILIARY PROCESSES AND THE LAYERS OF THE CILIARY MUSCLE, M. CILIARIS, ARE SEEN IN TRANSVERSE SECTION. THE CAPSULE OF THE LENS, WHICH IS ALSO SEEN IN THE SECTION, IS CONNECTED WITH THE CILIARY BODY BY MEANS OF THE FIBRÆ ZONULARES (RADIATING MERIDIONAL FIBRES OF THE ZONULE OF ZINN OR SUSPENSORY LIGAMENT OF THE LENS—see Appendix, note 489).

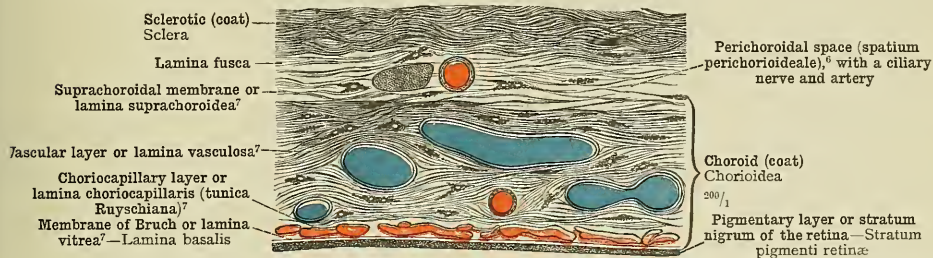


FIG. 1344.—THE LAYERS OF THE CHOROID (COAT), AS SEEN IN A CORONAL SECTION THROUGH THE POSTERIOR SMOOTH PORTION (see Appendix, note 482) OF THAT TUNIC (see Appendix, note 488). IN THE PERICHOROIDAL SPACE, SPATIUM PERICHORIOIDEALE (see Appendix, note 478), A CILIARY ARTERY, A. CILIARIS, AND A CILIARY NERVE, N. CILIARIS, ARE SEEN IN TRANSVERSE SECTION.

¹ See Appendix, note 482.

² See Appendix, note 484.

³ See note ¹ to p. 892.

See Appendix, note 485

⁵ See Appendix, note 489.

⁶ See Appendix, note 478.

⁷ See Appendix, note 486.

Tunica vasculosa seu uvea oculi—The middle or vascular coat of the eyeball.

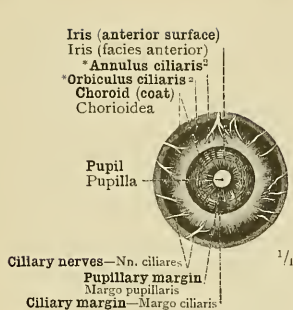


FIG. 1345.—THE IRIS OF A DARK BROWN EYE, WITH THE ADJOINING PORTIONS OF THE CHOROID (COAT). SEEN FROM BEFORE.

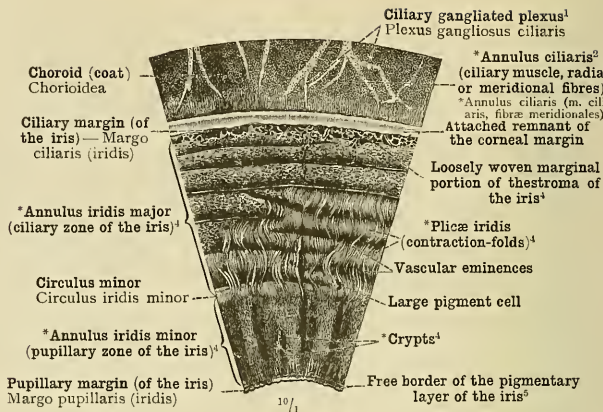


FIG. 1346.—A SECTOR OF THE IRIS DEPICTED IN FIG. 1345, MAGNIFIED. ANTERIOR SURFACE.



FIG. 1347.—THE IRIS OF A LIGHT GREY EYE, WITH THE ADJOINING PORTIONS OF THE CHOROID (COAT). SEEN FROM BEFORE.

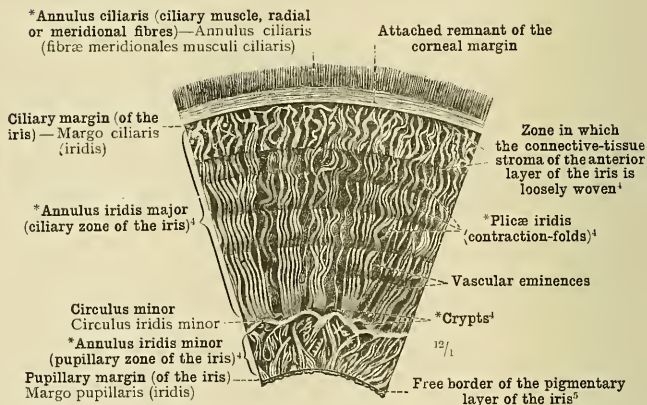


FIG. 1348.—A SECTOR OF THE IRIS DEPICTED IN FIG. 1347. ANTERIOR SURFACE.

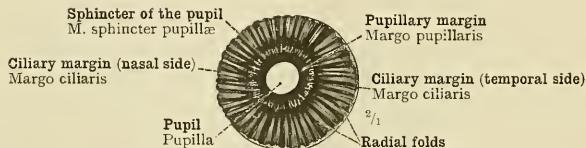


FIG. 1349.—THE POSTERIOR SURFACE, FACIES POSTERIOR, OF THE EXCISED IRIS OF A LIGHT GREY RIGHT EYE, AS SEEN WHEN THE PIGMENTARY LAYER (STRATUM PIGMENTI IRIDIS—see Appendix, note 488) HAS BEEN COMPLETELY REMOVED. THE PUPIL, PUPILLA, IS NOT PRECISELY CENTRAL IN POSITION, BUT LIES A LITTLE TO THE NASAL SIDE AND ABOVE THE MIDDLE.

¹ See Appendix, note 482.

² See Appendix, note 482.

³ See note 3 to p. 893.

⁴ See Appendix, note 487.

⁵ See Appendix, note 483.

Tunica vasculosa *sensu* uvea oculi—The middle or vascular coat of the eyeball.

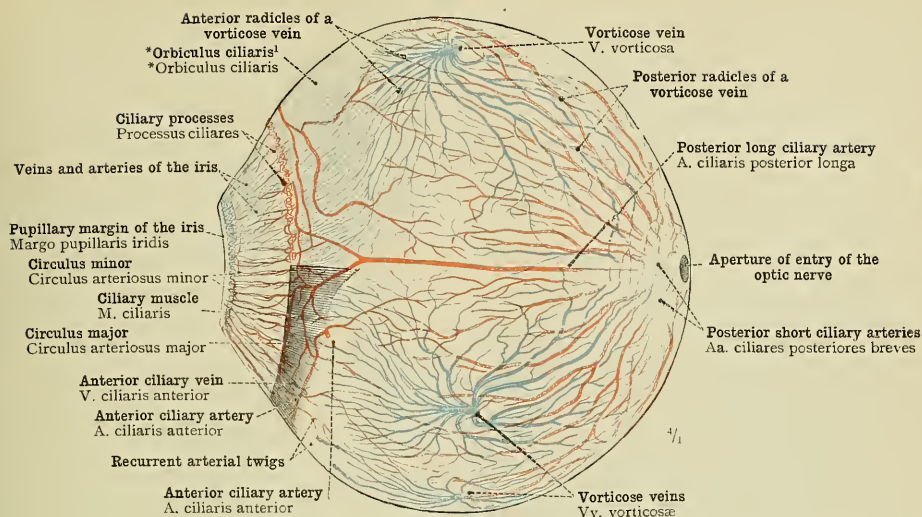


FIG. 1350.—DIAGRAMMATIC REPRESENTATION OF THE ARRANGEMENT OF THE BLOODVESSELS IN THE MIDDLE OR VASCULAR COAT OF THE EYEBALL. AFTER TH. LEEBER. SEEN FROM THE OUTER SURFACE.

In the upper half of the preparation the ciliary muscle, *musculus ciliaris*, has been removed, so as to display the vessels of the ciliary processes.

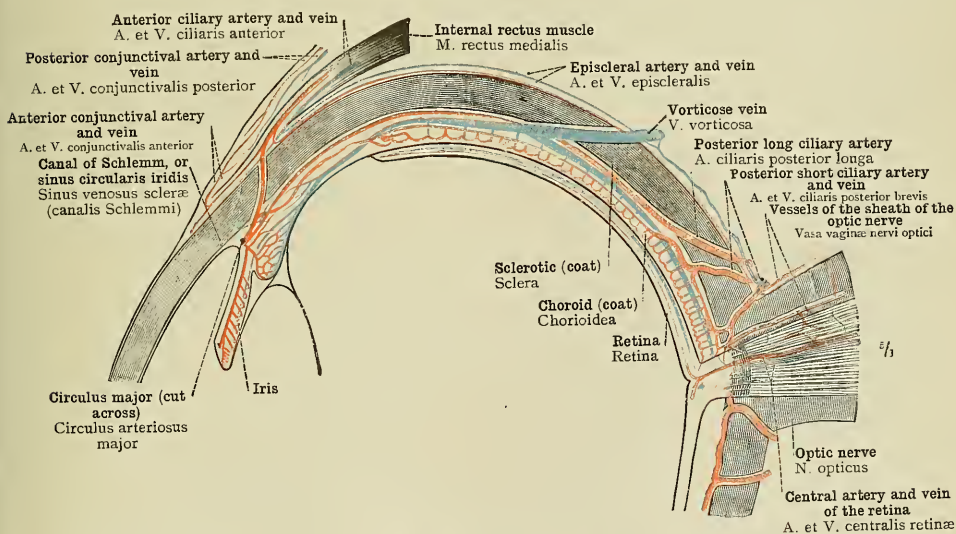


FIG. 1351.—DIAGRAMMATIC REPRESENTATION OF THE COURSE OF THE BLOODVESSELS IN THE EYEBALL. HORIZONTAL SECTION. AFTER TH. LEEBER.

¹ See Appendix, note 4th.

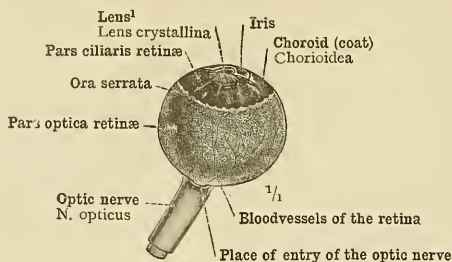


FIG. 1352.—THE INTERNAL COAT OF THE EYEBALL, THE RETINA, IN CONNEXION WITH THE OPTIC NERVE, EXPOSED BY THE REMOVAL OF THE EXTERNAL AND MIDDLE COAT. ITS TWO PARTS, PARS OPTICA AND PARS CILIARIS, WITH THE ORA SERRATA AS THE BOUNDARY BETWEEN THEM. EXTERNAL SURFACE. RIGHT EYE, SEEN FROM ABOVE.

A part of the iris and a part of the ciliary body have been preserved.

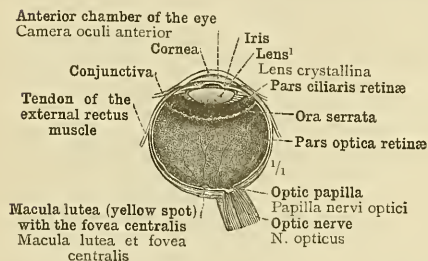


FIG. 1353.—THE RETINA IN CONNEXION WITH THE OPTIC NERVE, EXPOSED IN THE HORIZONTALLY HEMI-SECTED LEFT EYEBALL BY THE REMOVAL OF THE VITREOUS BODY. LOWER HALF OF THE EYEBALL. THE INTERIOR, SEEN FROM ABOVE.

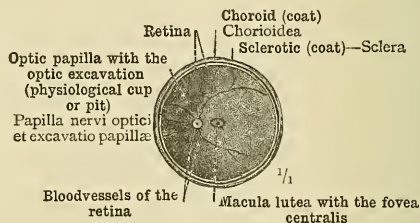


FIG. 1354.—THE POSTERIOR PORTION OF THE RETINA WITH THE OPTIC PAPILLA, PAPILLA NERVI OPTICI, AND THE YELLOW SPOT, MACULA LUTEA, AS SEEN IN A CORONALLY HEMI-SECTED LEFT EYEBALL. THE INTERIOR, SEEN FROM BEFORE.

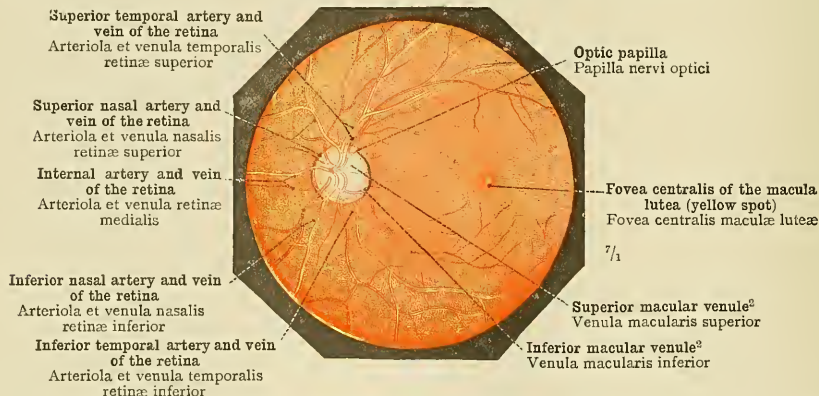


FIG. 1355.—THE FUNDUS OF THE EYEBALL WITH THE BLOODVESSELS OF THE RETINA, AS SEEN IN THE NORMAL LEFT EYE OF A DARK-HAIRED YOUNG MAN. ERECT IMAGE. AFTER E. V. JÄGER.

¹ See note ¹ to p. 892.

² See Appendix, note ⁴⁹⁰.

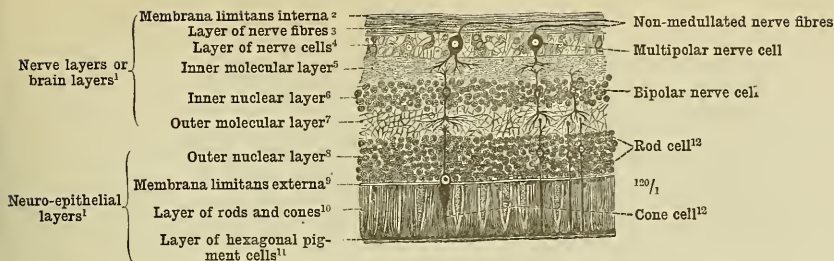


FIG. 1356.—THE LAYERS OF THE RETINA (see notes ¹ to ¹² inclusive), AS SEEN IN A SAGITTAL SECTION. THE ARRANGEMENT OF THE ELEMENTARY PARTS IS REPRESENTED DIAGRAMMATICALLY.

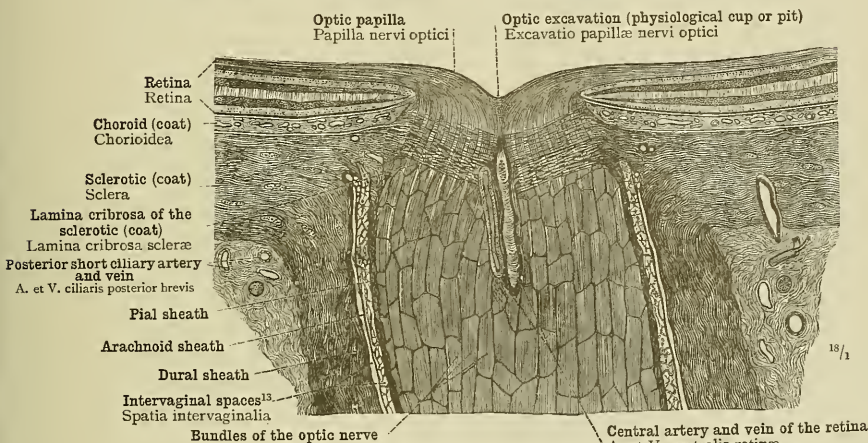


FIG. 1357.—THE TERMINAL PORTION OF THE OPTIC NERVE, N. OPTICUS, AND ITS ENTRANCE INTO THE EYEBALL, IN HORIZONTAL SECTION. THE SHEATHS OF THE OPTIC NERVE, VAGINÆ NERVI OPTICI, IN LONGITUDINAL SECTION.

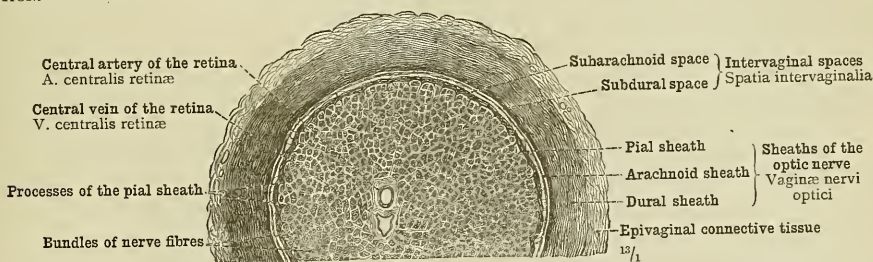


FIG. 1358.—PART OF A TRANSVERSE SECTION OF THE ANTERIOR PORTION OF THE OPTIC NERVE. THE SHEATHS OF THE OPTIC NERVE, VAGINÆ NERVI OPTICI, IN TRANSVERSE SECTION.

¹ See Appendix, note ⁴⁹⁰.

³ Or *stratum opticum*.

⁵ Also known as the *inner reticular* or *inner plexiform* layer, and in Latin as the *neurospongium* or as the *stratum reticulare internum*.

⁶ Also known as the *stratum granulosum* or *stratum granulosum*.

⁷ Also known as the *outer reticular* or *outer plexiform* layer, and in Latin as the *stratum reticulare externum*.

⁸ Also known as the *stratum granulosum externum*.

⁹ Sometimes spoken of in English as the *external limiting membrane*.

¹⁰ Also known as the *bacillary layer*, or *stratum bacillorum*.

¹¹ The *pigmentary layer* of the retina is also known as the *stratum nigrum*; in the official German nomenclature it is the *stratum pigmenti retinae*.

¹² See Appendix, note ⁴⁹¹.

¹³ Sometimes separately classed as *subdural* and *subarachnoid spaces* of the optic nerves. (See Fig. 1358.)

² Sometimes spoken of in English as the *internal limiting membrane*.

⁴ Also known as the *ganglion nervi optici*, both in the English and in the official German nomenclature.

¹⁰ Also known as the *stratum granulosum* or *stratum granulosum*.

¹¹ Also known as the *outer reticular* or *outer plexiform* layer, and in Latin as the *stratum reticulare externum*.

¹² Also known as the *stratum granulosum externum*.

¹³ Sometimes spoken of in English as the *external limiting membrane*.

¹⁴ Also known as the *bacillary layer*, or *stratum bacillorum*.

¹⁵ The *pigmentary layer* of the retina is also known as the *stratum nigrum*; in the official German nomenclature it is the *stratum pigmenti retinae*.

¹⁶ See Appendix, note ⁴⁹¹.

¹⁷ Sometimes separately classed as *subdural* and *subarachnoid spaces* of the optic nerves. (See Fig. 1358.)



FIG. 1359.—THE VITREOUS BODY, CORPUS VITREUM, REMOVED FROM THE EYE IN THE FRESH STATE, WITH THE SAUCER-SHAPED HOLLOW, FOSSA PATELLARIS (FOSSA HYALOIDEA), IN WHICH THE LENS LIES. SEEN OBLIQUELY FROM THE SIDE AND BEFORE.

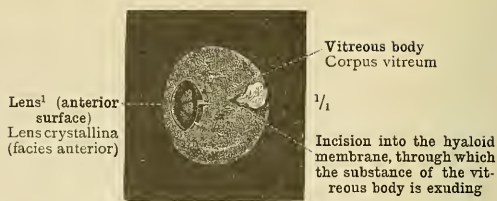


FIG. 1360.—THE VITREOUS BODY, CORPUS VITREUM, WITH THE LENS, LENS CRYSTALLINA, REMOVED FROM THE EYE IN THE FRESH STATE. THROUGH A SMALL INCISION IN THE HYALOID MEMBRANE, A PART OF THE SUBSTANCE OF THE VITREOUS BODY, CORPUS VITREUM, HAS EXUDED.

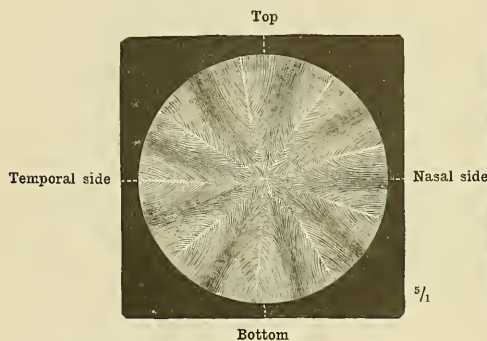


FIG. 1361.—ANTERIOR SURFACE, FACIES ANTERIOR.

THE LENS OF THE EYE, LENS CRYSTALLINA (see note ¹ to p. 892), REMOVED FROM THE BODY WITHIN A FEW HOURS AFTER DEATH, AND DEPICTED LYING IN FORMALIN SOLUTION WITH THE AID OF THE STEREOSCOPIC MICROSCOPE. COURSE AND ARRANGEMENT OF THE LENS FIBRES, FIBRAE LENTIS.

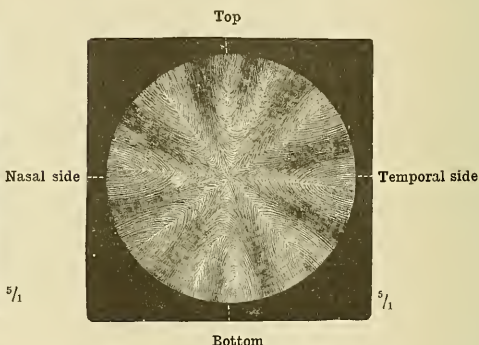


FIG. 1362.—POSTERIOR SURFACE, FACIES POSTERIOR.

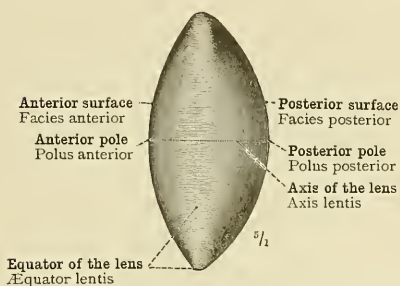


FIG. 1363.—THE TERMS USED IN THE ORIENTATION OF THE LENS.

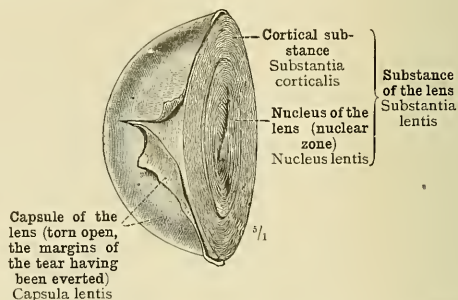


FIG. 1364.—HALF OF THE LENS WITH THE CAPSULE OF THE LENS PARTIALLY PEELED OFF.

The fresh lens was hemisected, and was drawn after it had been allowed to lie in water for twenty-four hours.

¹ See note ¹ to p. 892.

Corpus vitreum—The vitreous body.—Lens crystallina—The lens.

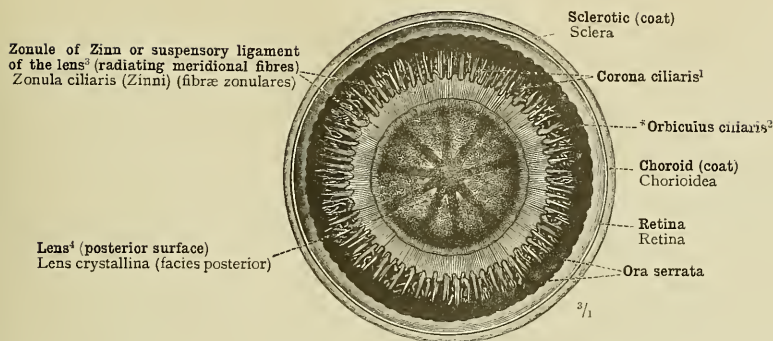


FIG. 1365.—THE ZONULE OF ZINN OR SUSPENSORY LIGAMENT OF THE LENS, ZONULA CILIARIS ZINNI (see *Appendix*, note 489), VIEWED FROM BEHIND, IN CONNEXION WITH THE LENS AND THE CILIARY BODY.

IN AN EYEBALL REMOVED FROM THE BODY WITHIN A FEW HOURS AFTER DEATH, THE CORNEA WAS EXCISED, THE IRIS COMPLETELY REMOVED, AND THE EYEBALL WAS THEN CUT IN TWO A LITTLE IN FRONT OF THE EQUATOR. THE ZONULE OF ZINN OR SUSPENSORY LIGAMENT OF THE LENS, ZONULA CILIARIS ZINNI (see *Appendix*, note 489), WAS NOW VISIBLE IN THE ANTERIOR SEGMENT OF THE EYE, COVERED ONLY BY THE PERFECTLY TRANSPARENT VITREOUS SUBSTANCE. THE PREPARATION WAS THEN IMMERSSED IN 3 PER CENT. FORMALIN SOLUTION, AND WAS DRAWN IMMEDIATELY WITH THE AID OF THE STEREOSCOPIC MICROSCOPE, THE ILLUMINATION BEING PARTLY BY DIRECT, PARTLY BY TRANSMITTED LIGHT.

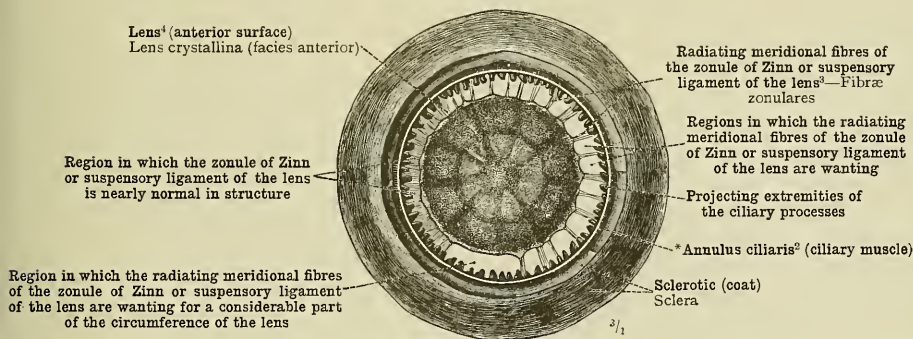


FIG. 1366.—A CASE OF INCOMPLETE DEVELOPMENT OF THE ZONULE OF ZINN OR SUSPENSORY LIGAMENT OF THE LENS, ZONULA CILIARIS ZINNI (see *Appendix*, note 489), INTRODUCED TO SHOW THE NATURE OF THE TRACTION WHICH IS EXERCISED BY THE ZONULE ON THE LENS. SEEN FROM BEFORE.

THE LENS IS SEEN TO BE DRAWN AS A WHOLE TOWARDS THAT SIDE ON WHICH A PORTION OF THE ZONULE IS ALMOST FULLY DEVELOPED. IN THOSE REGIONS IN WHICH THE RADIATING MERIDIONAL FIBRES OF THE ZONULE (FIBRÆ ZONULARES) ARE DEVELOPED IN ISOLATED SLENDER BUNDLES ONLY, THE MARGIN OF THE LENS IS NOTABLY DRAWN OUTWARDS AT THE POINTS WHERE THESE BUNDLES ARE INSERTED. GENERALLY SPEAKING, ALL ALONG THE EQUATOR OF THE LENS THE CAPSULE IS SEEN TO BE DRAWN A LITTLE AWAY FROM THE SUBSTANCE OF THE LENS.

The specimen was freshly prepared in the same manner as described at the foot of Fig. 1365.

¹ See *Appendix*, note 488.

² See *Appendix*, note 480.

³ See *Appendix*, note 480.

⁴ See note ¹ to p. 892.

Zonula ciliaris (Zinni)—The zonule of Zinn or suspensory ligament of the lens.

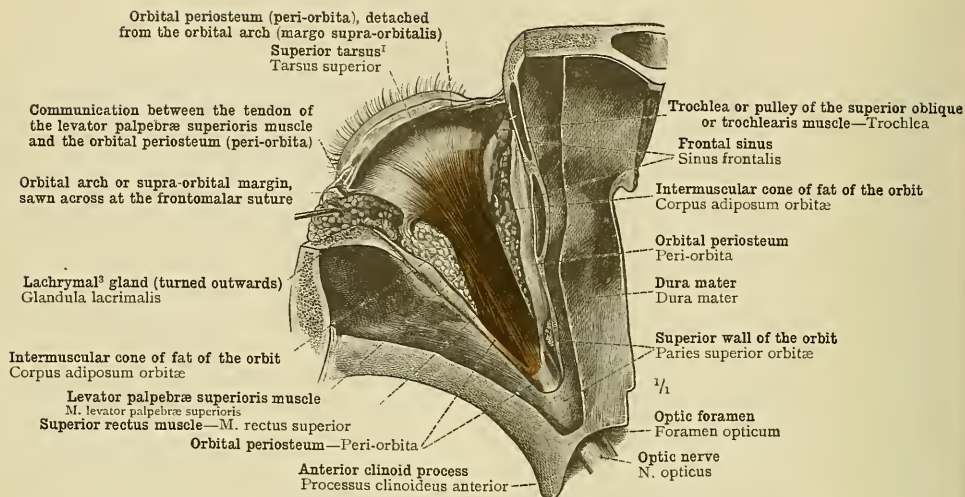


FIG. 1367.—THE LEVATOR PALPEBRÆ SUPERIORIS MUSCLE, SEEN FROM ABOVE.

Displayed by cutting away the upper wall of the left orbit and the partial removal of the orbital periosteum (peri-orbita). The lachrymal gland has been drawn outwards.

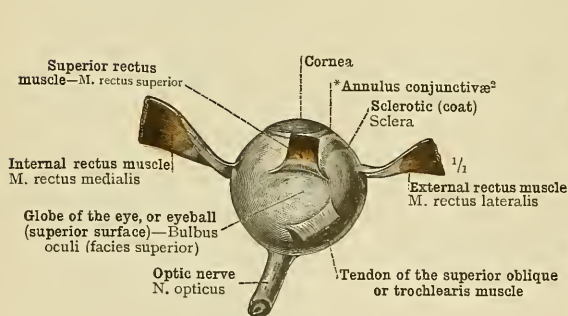


FIG. 1368.—THE INSERTIONS OF THE SUPERIOR, EXTERNAL, AND INTERNAL RECTUS MUSCLES INTO THE EYEBALL; ALSO THAT OF THE SUPERIOR OBLIQUE OR TROCHLEARIS MUSCLE. RIGHT EYE. SEEN FROM ABOVE.

The extremities of the muscles have been raised from the eyeball and inverted.

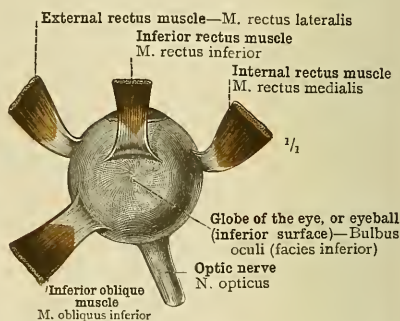


FIG. 1369.—THE INSERTIONS INTO THE EYEBALL OF THE INFERIOR, INTERNAL, AND EXTERNAL RECTUS MUSCLES; ALSO THAT OF THE INFERIOR OBLIQUE MUSCLE. RIGHT EYE. SEEN FROM BELOW.

The extremities of the muscles have been raised from the eyeball and inverted.

¹ See Appendix, note 492.

² See Appendix, note 493.

³ The spelling *lacrimal*, etymologically more correct than *lachrymal*, is used by some English writers. The form *lachrymal* is, however, in far more general use.

Musculi oculi—The muscles of the eyeball.

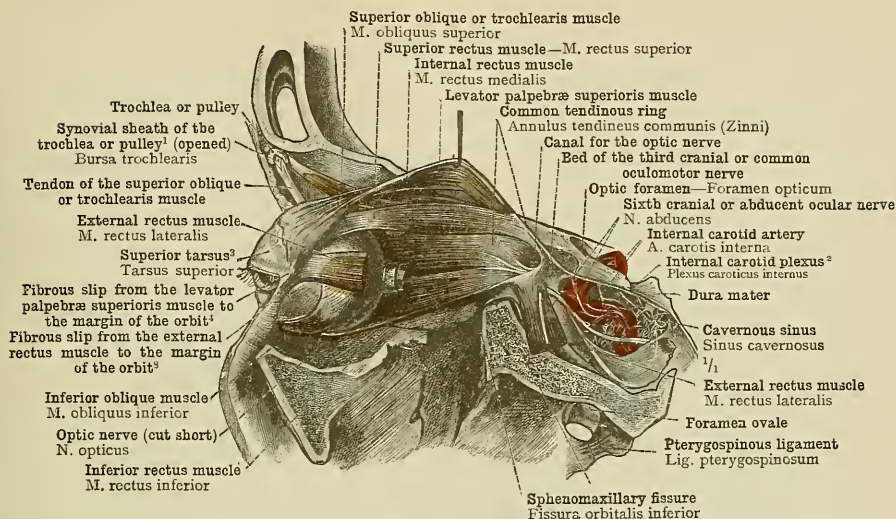


FIG. 1370.—THE MUSCLES OF THE ORBIT FROM THE TEMPORAL SIDE. LEFT EYE.

After the superior and external walls of the orbit had been removed, the external rectus muscle was cut across, its posterior segment was turned downwards, and the optic nerve was excised.

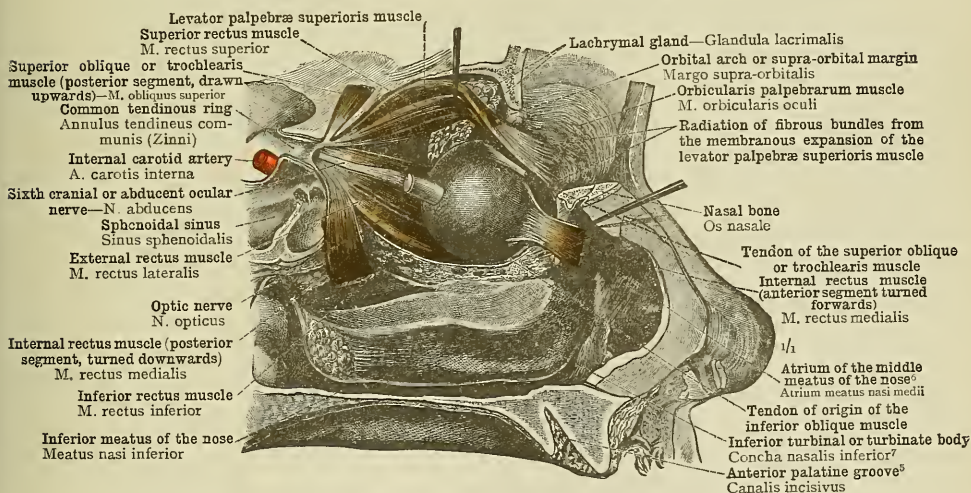


FIG. 1371.—THE MUSCLES OF THE ORBIT FROM THE NASAL SIDE. LEFT EYE.

After the internal and part of the superior walls of the orbit had been removed, the internal rectus muscle was cut across, its anterior segment being turned forwards, its posterior segment downwards, and the optic nerve was excised. Of the superior oblique or trochlearis muscle, the posterior extremity and a portion of the tendon of insertion were retained; the inferior oblique muscle was cut across near its origin.

¹ See Appendix, note 494.

² See note 3 to p. 859.

³ See Appendix, note 497.

⁴ See Appendix, note 495.

⁵ See Appendix, note 454.

⁶ By Macalister called the *region of the atrium*.

⁷ See note ¹ to p. 944.

⁸ Or *outer check ligament*, see Appendix, note 495.

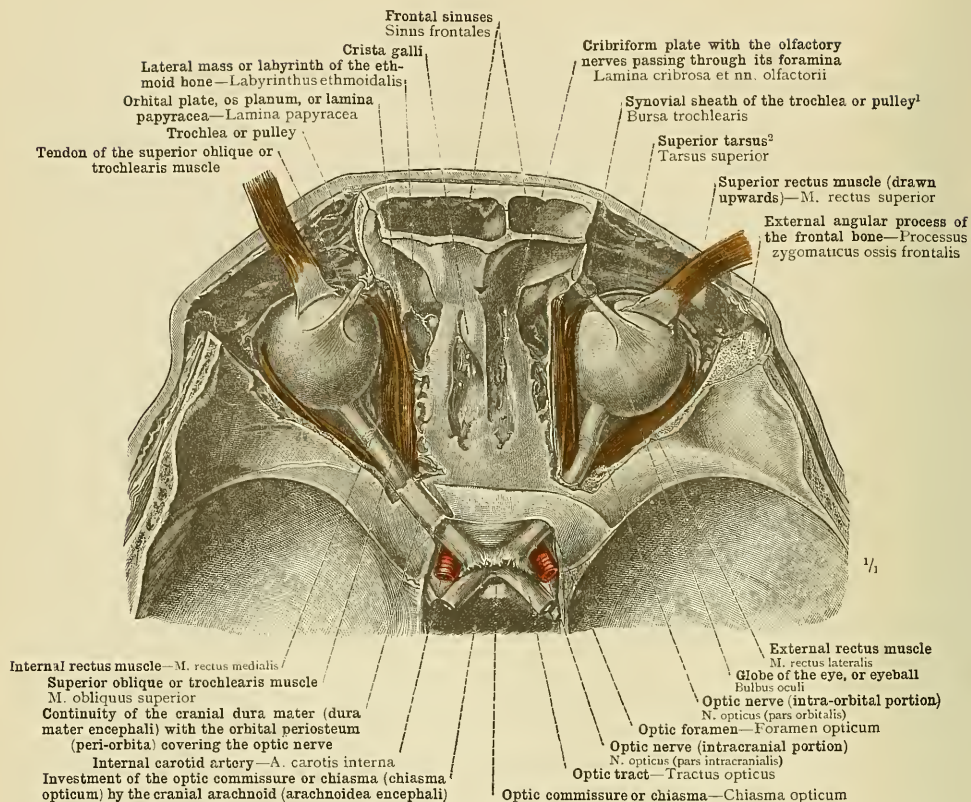


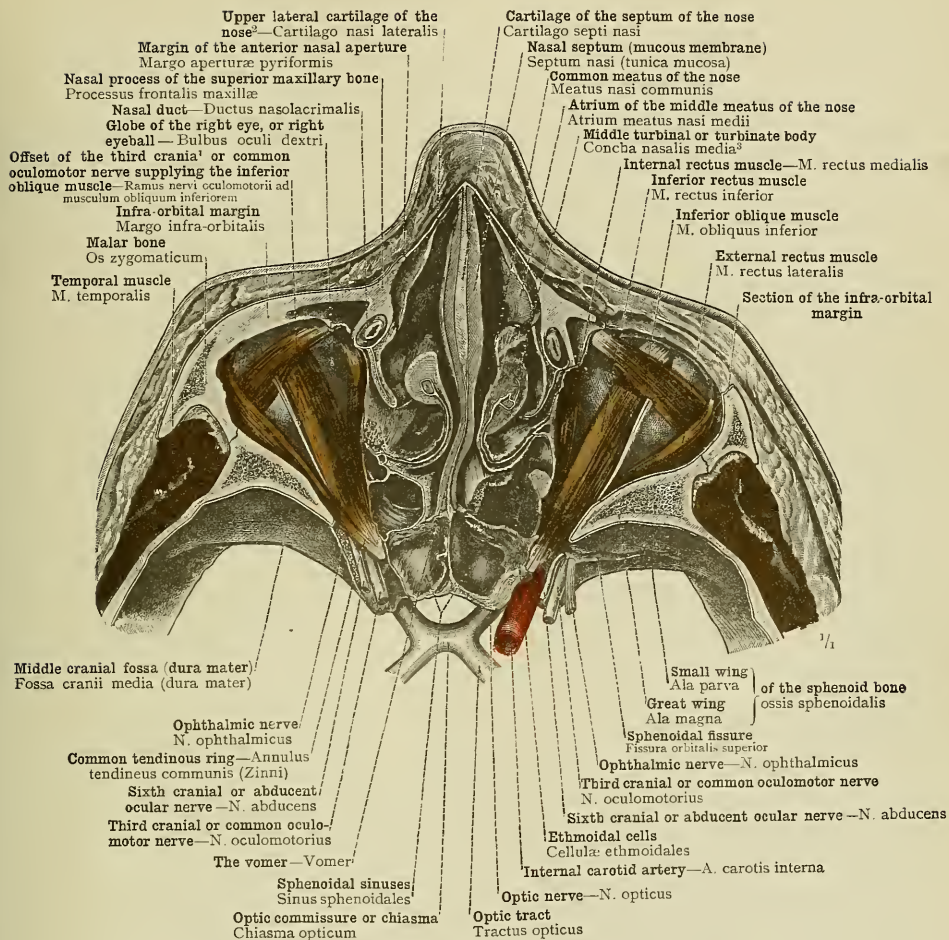
FIG. 1372.—THE POSITION OF THE EYEBALL AND THE OPTIC NERVE IN THE ORBIT, AND THE RELATIONS OF THE MUSCLES OF THE ORBIT TO THESE STRUCTURES. SEEN FROM ABOVE. THE MUTUAL RELATIONS OF THE POSTERIOR (INTRACRANIAL) PORTION OF THE OPTIC NERVE AND THE INTERNAL CAROTID ARTERY, AND THE POSITION OF THE OPTIC COMMISSURE OR CHIASMA, CHIASMA OPTICUM, IN RELATION TO THE PITUITARY FOSSA, FOSSA HYOPHYSIOS, AND TO THE **LIMBUS SPHENOIDALIS*.³

The superior and part of the external walls of the orbits having been cut away, the levator palpebrae superioris muscles were entirely removed, and the rectus superior muscles were detached from their origins and turned forwards. On the left side the optic foramen was opened from above, in order to show the connexion between the cranial dura mater and the orbital periosteum (peri-orbita).

¹ See Appendix, note 404.

² See Appendix, note 402.

³ **Limbus Sphenoidalis*.—This name is given by Von Langer and Toldt to the slight ridge which connects the anterior margins of the optic foramina, and forms the anterior boundary of the optic groove in which the optic commissure lies. It is the boundary also between the middle portions of the anterior and middle cranial fossae. It is left unnamed by Quain, nor is it indicated by name in the osteological section of this Atlas.



¹ By Macalister called the *region of the atrium*.

² The *upper lateral cartilages* are by Macalister called the *lateral expansions of the septal cartilage*.

³ See note ² to p. 944.

FIG. 1373.—THE POSITION OF THE EYEBALL IN THE ORBIT, AND THE RELATIONS OF THE MUSCLES OF THE ORBIT TO THE EYEBALL. SEEN FROM BELOW.

In the facial portion of a head previously hardened in chromic acid and alcohol, a horizontal section was carried backwards beneath the infra-orbital margins through the body of the sphenoid bone and the inner portions of the sphenoidal fissures. In the upper segment, by the removal of the orbital cone of fat, the orbital muscles accessible from below have been displayed. On the left side the infra-orbital margin has been completely removed.

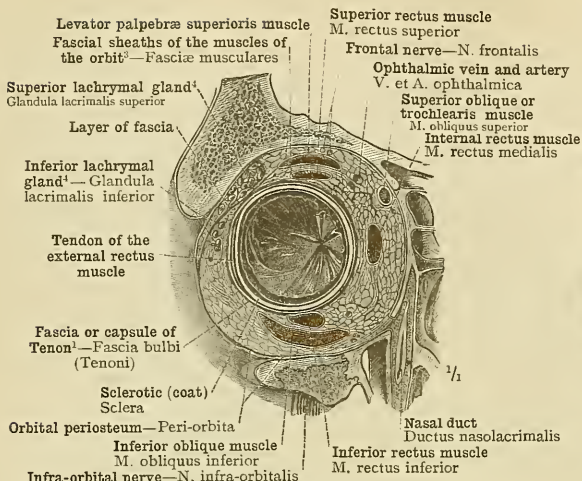


FIG. 1374.—THE POSITION OF THE EYEBALL AND OF THE MUSCLES OF THE ORBIT, AS SEEN IN A CORONAL SECTION THROUGH THE RIGHT ORBIT OF A HEAD FIRST HARDENED IN CHROMIC ACID AND ALCOHOL, AND SUBSEQUENTLY DECALCIFIED IN HYDROCHLORIC ACID.

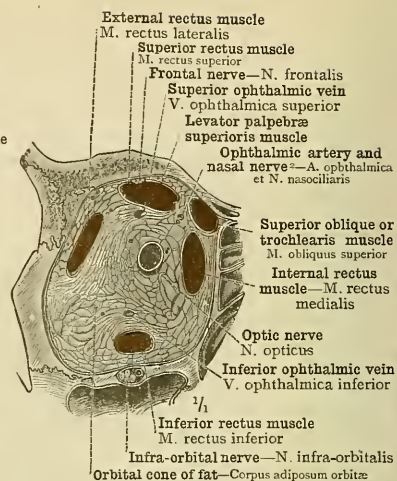


FIG. 1375.—THE POSITION OF THE OPTIC NERVE AND OF THE MUSCLES OF THE ORBIT, AS SEEN IN A CORONAL SECTION THROUGH THE RIGHT ORBIT OF A HEAD FIRST HARDENED IN CHROMIC ACID AND ALCOHOL, AND SUBSEQUENTLY DECALCIFIED IN HYDROCHLORIC ACID.

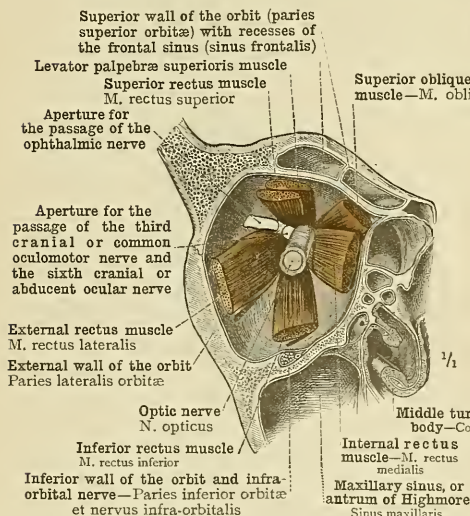


FIG. 1376.—POSITION AND DIRECTION OF THE MUSCLES OF THE ORBIT IN RELATION TO THE OPTIC NERVE, AS SEEN IN THE POSTERIOR SEGMENT OF A CORONALLY DIVIDED RIGHT ORBIT. THE HEAD WAS PREVIOUSLY HARDENED IN CHROMIC ACID AND ALCOHOL.

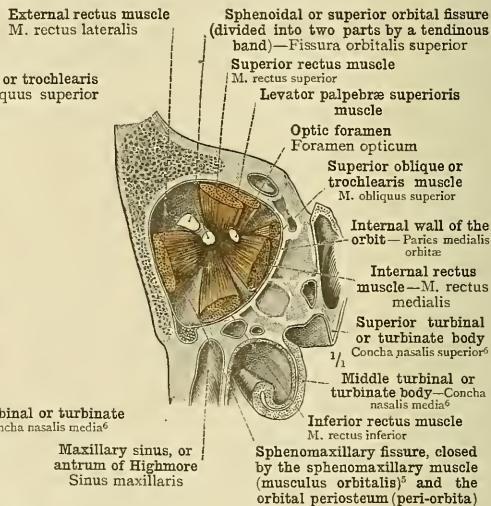


FIG. 1377.—POSITION OF THE MUSCLES OF THE ORBIT IN RELATION TO THE OPTIC FORAMEN AND THE SPHENOIDAL OR SUPERIOR ORBITAL FISSURE, AS SEEN IN THE POSTERIOR SEGMENT OF A CORONALLY DIVIDED RIGHT ORBIT. THE HEAD WAS PREVIOUSLY HARDENED IN CHROMIC ACID AND ALCOHOL.

¹ Sometimes called *tunica vaginalis oculi*.

² Also known as the *oculonasal* and as the *nasociliary* nerve.

³ See Appendix, note 495.

⁴ See Appendix, note 595.

⁵ See Appendix, note 458.

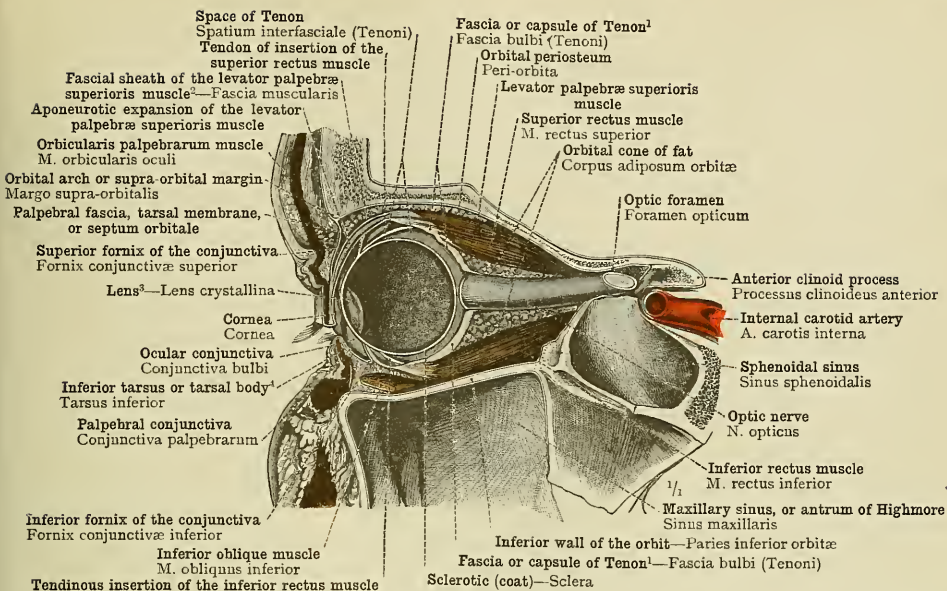


FIG. 1378.—FASCIA OR CAPSULE OF TENON,¹ FASCIA BULBI, AND ITS RELATION TO THE TENDONS OF THE SUPERIOR AND INFERIOR RECTUS MUSCLES (see Appendix, note 465).

The right orbit of a head previously hardened in chromic acid and alcohol was divided sagittally in such a manner that the section passed through the nasal half of the eyeball and opened the optic foramen on the nasal side of the optic nerve. The fascia or capsule of Tenon has been withdrawn a little from the surface of the eyeball.

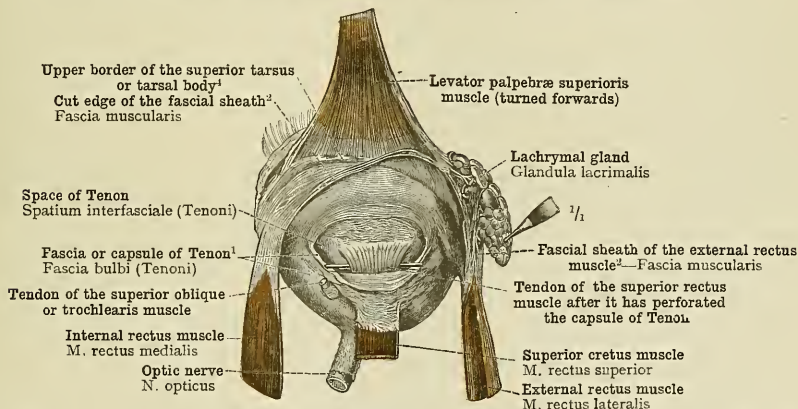


FIG. 1379.—FASCIA OR CAPSULE OF TENON, AND ITS RELATION TO THE TENDON OF THE SUPERIOR RECTUS MUSCLE, AS SEEN FROM ABOVE IN THE EXCISED RIGHT EYE.

The levator palpebrae superioris muscle has been turned forwards, and the capsule of Tenon has been opened by a transverse incision in the region of the tendon of the superior rectus muscle.

¹ Sometimes called *tunica vaginalis oculi*.

² See Appendix, note 465.

³ See note ¹ to p. 892.

⁴ See Appendix, note 462.

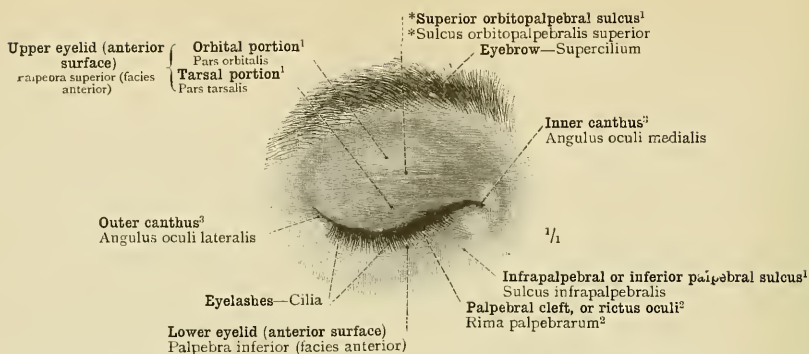


FIG. 1380.—THE CLOSED EYELIDS OF THE RIGHT EYE OF A YOUNG WOMAN, REPRODUCED FROM A LIFE SIZED PHOTOGRAPH. ANTERIOR SURFACE OF THE EYELIDS, FACIES ANTERIOR PALPEBRARUM.

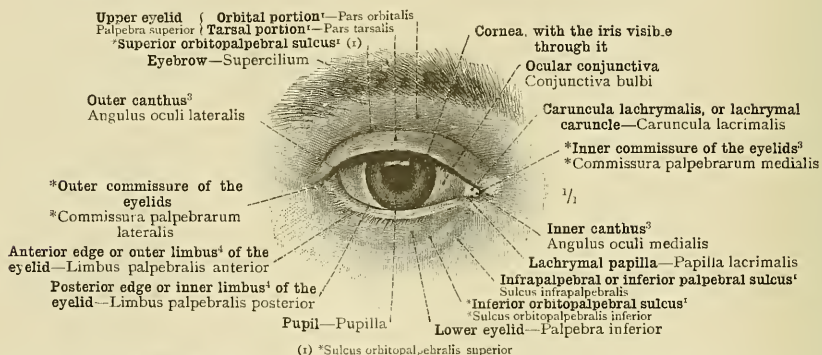


FIG. 1381.—THE SAME EYELIDS WITH THE EYE OPEN, REPRODUCED FROM A LIFE SIZED PHOTOGRAPH. THE PALPEBRAL CLEFT, RICTUS OCULI, OR RIMA PALPEBRARUM (see Appendix, note 497).

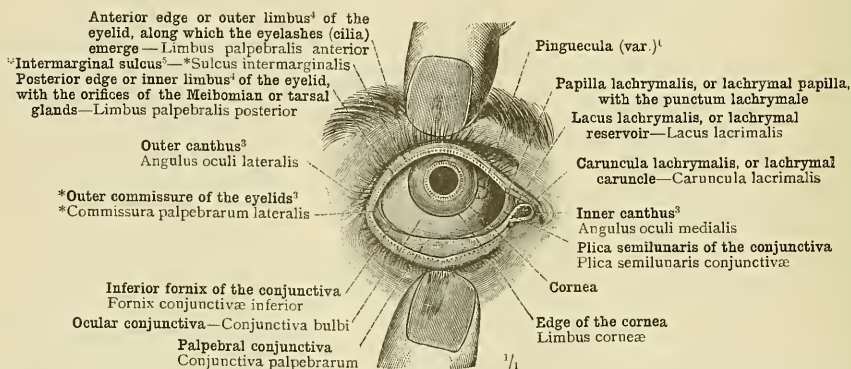


FIG. 1382.—THE WIDELY-OPENED EYELIDS OF THE RIGHT EYE OF AN ELDERLY PERSON. THE LOWER EYELID HAS BEEN EVERTED. PINGUECULA.

¹ See Appendix, note 496.

² See Appendix, note 497.

³ See Appendix, note 498.

⁴ The term *limbus* in connexion with the eyelid is used by Macalister, but not by Quain. The former writer speaks indifferently of the *limbus anterior* or *outer limbus*, and of the *limbus posterior* or *inner limbus* (*op. cit.*, p. 522, and Fig. 712, p. 643).

⁵ See Appendix, note 499.

⁶ See Appendix, note 500.

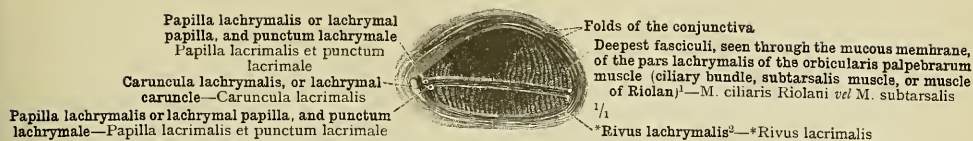


FIG. 1383.—THE POSTERIOR SURFACE OF THE EXCISED EYELIDS, FACIES POSTERIOR PALPEBRARUM. IN THE REGION OF THE Tarsi OR TARSAL MEMBRANES, THE MEIBOMIAN OR TARSAL GLANDS ARE VISIBLE BENEATH THE CONJUNCTIVA. RIGHT SIDE.

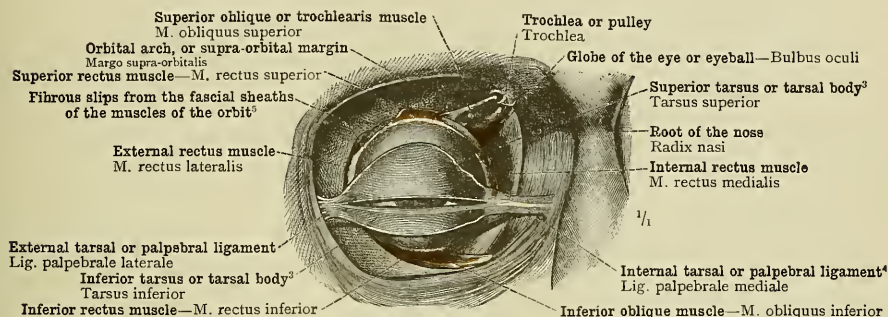


FIG. 1384.—THE SUPERIOR AND INFERIOR Tarsi OR TARSAL BODIES, TARSUS SUPERIOR ET TARSUS INFERIOR (see Appendix, note ³⁹²), OF THE RIGHT EYE, WITH THE INTERNAL TARSAL OR PALPEBRAL LIGAMENT, LIGAMENTUM PALPEBRALE MEDIALE (see note ⁴ below), AND THE EXTERNAL TARSAL OR PALPEBRAL LIGAMENT, LIGAMENTUM PALPEBRALE LATERALE, ISOLATED. THEIR RELATIONS TO THE EYEBALL WHEN THE LIDS ARE CLOSED. THE ATTACHMENT OF THE RECTI MUSCLES TO THE EYEBALL, AND THE COURSE OF THE OBLIQUE MUSCLES. VIEWED FROM BEFORE.

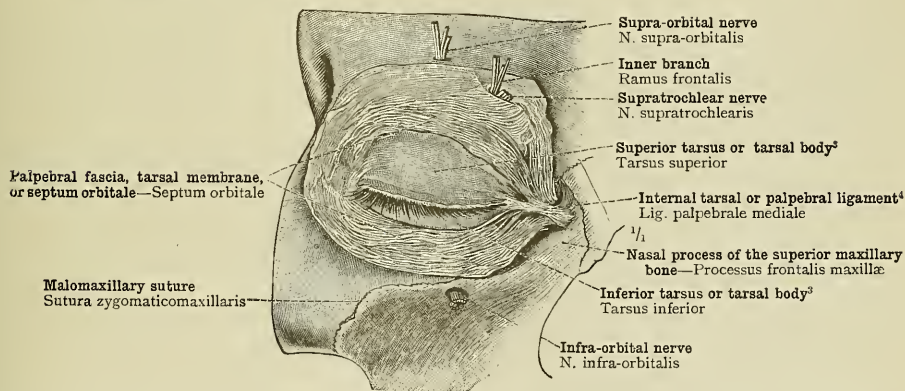


FIG. 1385.—THE PALPEBRAL FASCIA, TARSAL MEMBRANE, OR SEPTUM ORBITALE, IN CONNEXION WITH THE Tarsi OR TARSAL BODIES (see Appendix, note ³⁹²), DISPLAYED FROM BEFORE BY THE REMOVAL OF THE SKIN AND THE ORBICULARIS PALPEBRARUM MUSCLE. RIGHT SIDE.

¹ See Appendix, note 594.

² See Appendix, note 595.

³ See Appendix, note 492.

⁴ Known also as the tendon of the orbicularis muscle, or tendo palpebrarum.

⁵ See Appendix, note 495.

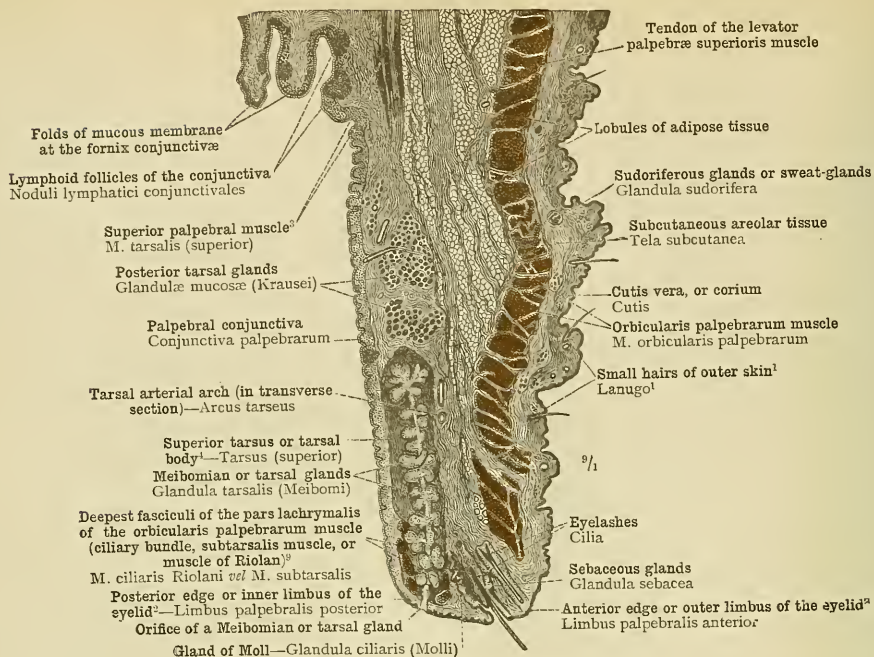


FIG. 1386.—THE UPPER EYELID IN SAGITTAL SECTION.

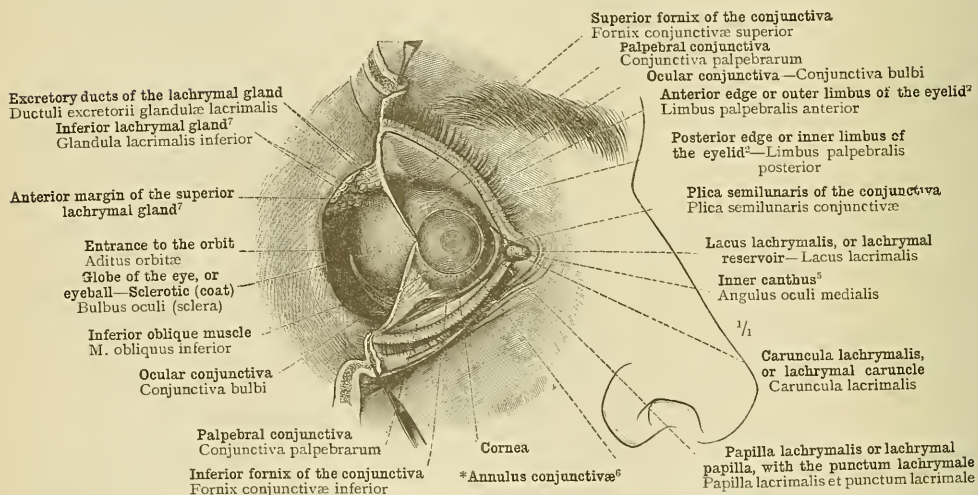


FIG. 1387.—THE CONJUNCTIVA OF THE RIGHT EYE. ITS THREE PARTS: THE PALPEBRAL CONJUNCTIVA, CONJUNCTIVA PALPEBRARUM; THE OCULAR CONJUNCTIVA, CONJUNCTIVA BULBI; AND ITS REFLECTION ALONG THE FORNICES.⁵ THE EYELIDS WERE SEPARATED BY DIVISION OF THE OUTER CANTHUS (see Appendix, note 498), AND A HORIZONTAL INCISION CARRIED THENCE THROUGH THE CONJUNCTIVA INWARDS TO THE MARGIN OF THE CORNEA.

¹ See Appendix, note 503.² See note 4 to p. 508.³ See Appendix, note 504.⁴ See Appendix, note 492.⁵ See Appendix, note 498.⁶ See Appendix, note 493.⁷ See Appendix, note 505.⁸ This part of the conjunctiva is in the German original called *der Uebergangstheil*, the transitional part. No Latin term is used.⁹ See Appendix, note 504.

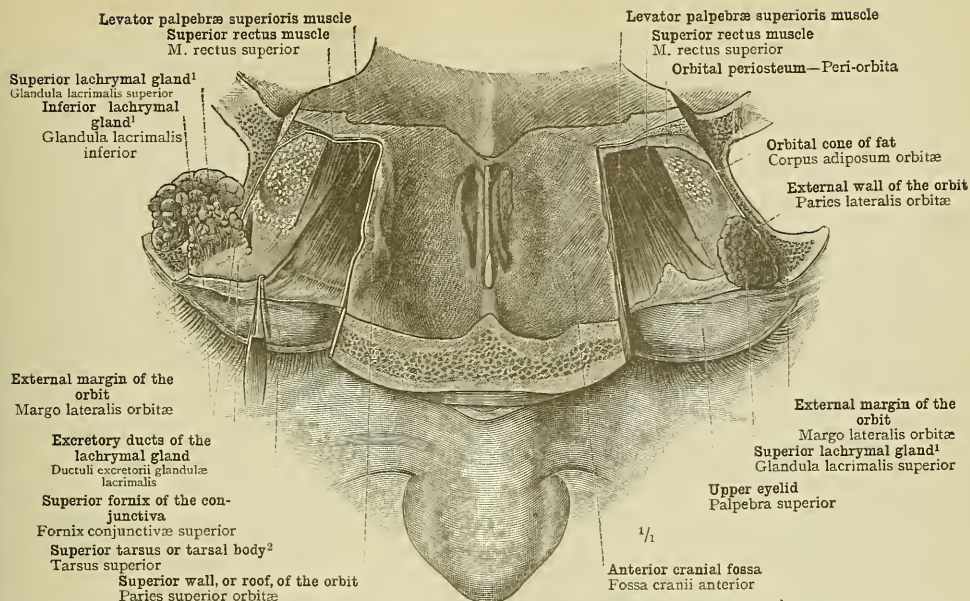


FIG. 1388.—THE LACHRYMAL GLAND, GLANDULA LACHRYMALIS (see Appendix, note 605), DISPLAYED BY OPENING THE ORBIT FROM ABOVE. THE LEFT LACHRYMAL GLAND IS SEEN IN ITS NATURAL POSITION, BUT THE RIGHT GLAND, IN ORDER TO EXPOSE ITS EXCRETORY DUCTS, HAS BEEN TURNED BACKWARDS.

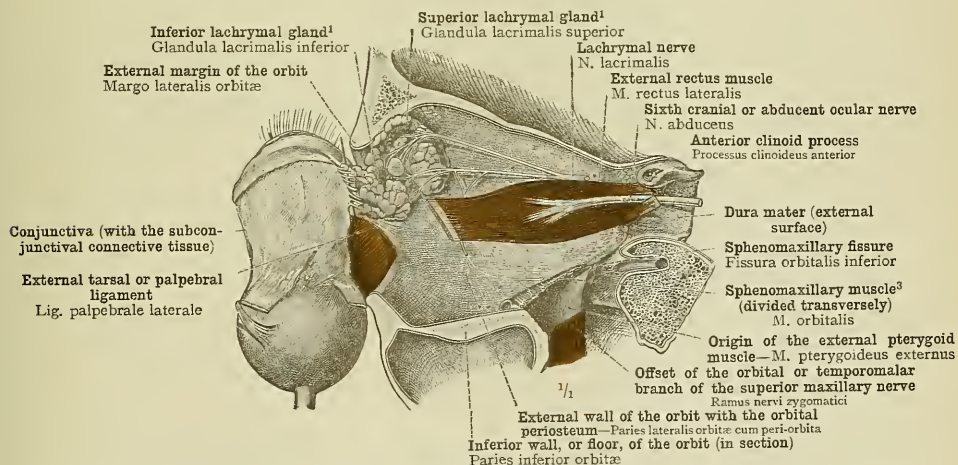


FIG. 1389.—THE NATURAL POSITION OF THE LACHRYMAL GLAND, IN RELATION TO THE WALL OF THE ORBIT AND TO THE EXTERNAL TARSAL OR PALPEBRAL LIGAMENT. OUTER HALF OF THE RIGHT ORBIT.

The eyeball, together with the fully-exposed conjunctiva, the folds of which have been obliterated by tension, has been withdrawn from the orbit. The excretory ducts, ductuli excretorii, of the lacrimal gland have been slightly raised by means of a probe which has been passed beneath them.

¹ See Appendix, note 595.

² See Appendix, note 495.

³ See Appendix, note 459.

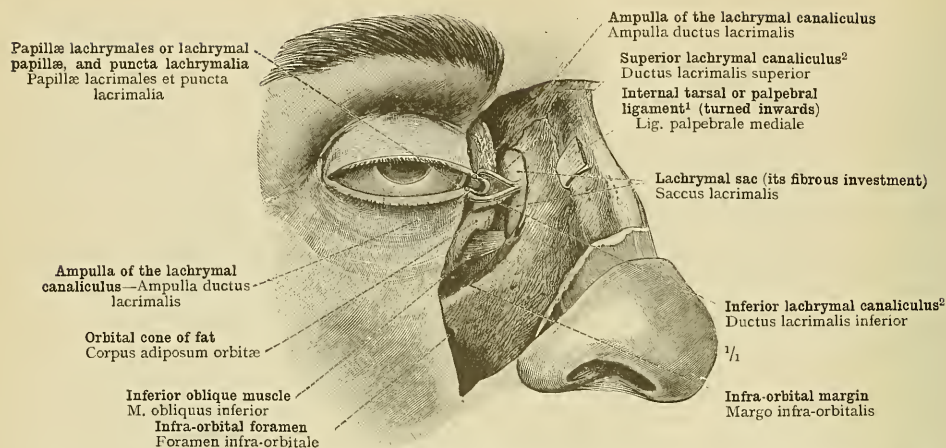


FIG. 1390.—THE LACHRYMAL SAC, SACCUS LACRIMALIS, WITH THE LACHRYMAL CANALICULI, DUCTUS LACRIMALES, DISPLAYED BY THE REMOVAL OF THE SKIN, THE INTERNAL TARSALE OR PALPEBRAL LIGAMENT¹, THE ORBICULARIS PALPEBRARUM MUSCLE, AND THE OTHER FACIAL MUSCLES IN THE NEIGHBOURHOOD. THE FIBROUS INVESTMENT OF THE LACHRYMAL SAC IS EXPOSED. RIGHT SIDE.

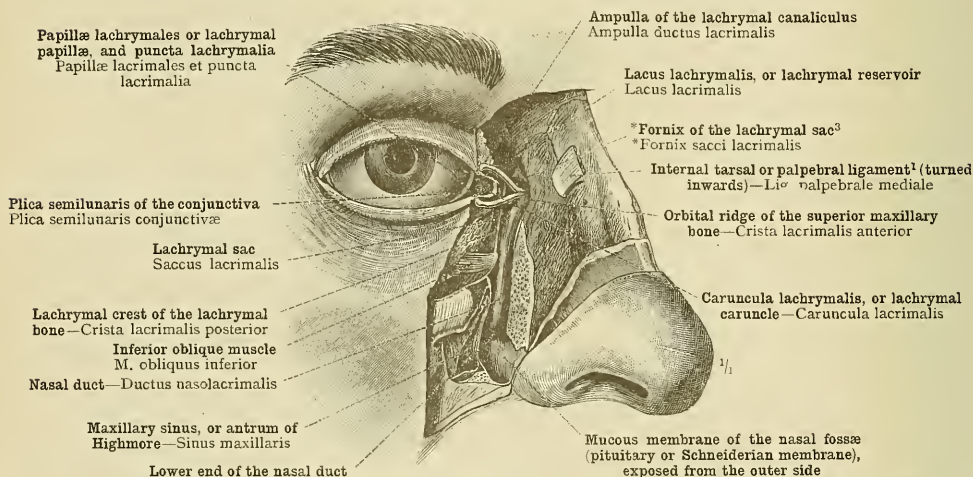


FIG. 1391.—THE LACHRYMAL SAC, SACCUS LACRIMALIS, WITH THE LACHRYMAL CANALICULI, DUCTUS LACRIMALIS, AND THE NASAL DUCT, DUCTUS NASOLACRIMALIS, OF THE RIGHT SIDE.

In the preparation shown in Fig. 1390, the substance of the superior maxillary bone was removed from without inwards as far as the lachrymal groove, sulcus lacrimalis, and the anterior and external walls of the nasal duct, ductus nasolacrimalis, were thus exposed up to the point at which these walls become continuous with mucous membrane of the nasal fossæ. The fibrous investment of the lachrymal sac was also removed, so that the outer side of the mucous membrane, alike of the lachrymal sac and of the nasal duct, is exposed to view.

¹ Known also as the *tendon of the orbicularis muscle*, or *tendo palpebrarum*.

² *Lachrymal Canaliculi*.—Quain speaks of these as the *lachrymal canals*, but this usage is exceptional.

³ **Fornix of the Lachrymal Sac*.—The name of *fornix sacci lacrimalis* is given by Toldt to the upper blind extremity of the lachrymal sac. The term is not used by Quain or Macalister.

Apparatus lacrimalis—The lachrymal apparatus.

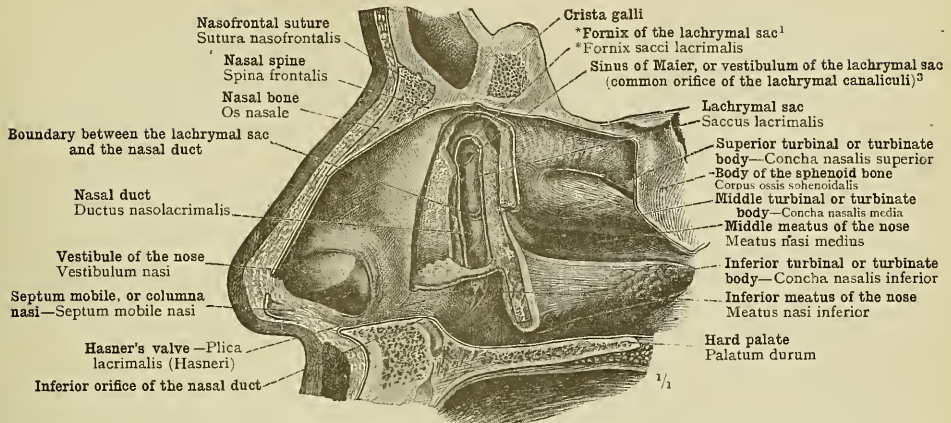


FIG. 1392.—THE LACHRYMAL SAC, SACCUS LACRIMALIS, AND THE NASAL DUCT, DUCTUS NASOLACRIMALIS, OF THE RIGHT SIDE, DISPLAYED FROM THE INTERIOR OF THE NASAL FOSSÆ. THE INFERIOR ORIFICE OF THE NASAL DUCT, IN THE INFERIOR MEATUS OF THE NOSE; HASNER'S VALVE, PLICA LACRIMALIS (HASNERI).

In a sagittally hemisected head, after the removal of the anterior portions of the middle and inferior turbinates or turbinate bodies, as well as the surrounding portions of the nasal mucous membrane (pituitary or Schneiderian membrane), the inner bony wall of the lacrimal groove and the nasal duct was removed as far down as the attachment of the inferior turbinate bone of the nose, so as to expose the lacrimal sac and the nasal duct. These were then both opened by the removal of their inner wall.

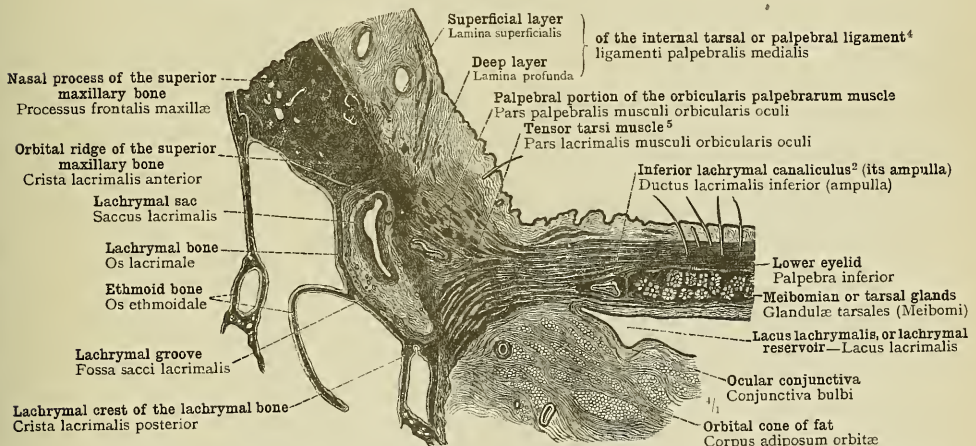


FIG. 1393.—HORIZONTAL SECTION THROUGH THE LACHRYMAL SAC AND THE MARGINAL PORTION OF THE LOWER EYELID. THE INFERIOR LACHRYMAL CANALICULUS (see note ² to p. 912) APPEARS TWICE IN THE SECTION, AND THE SUPERIOR LACHRYMAL CANALICULUS IS CUT ACROSS QUITE NEAR TO THE LACHRYMAL SAC.

¹ See note 3 to p. 912.

² See note 2 to p. 912.

³ See Appendix, note 594.

⁴ Known also as the tendon of the orbicularis muscle, or tendo palpebrarum.

⁵ Known also as Horner's muscle (musculus Horneri), and as the musculus sacci lacrimalis. Sometimes also in England called pars lacrimalis musculi orbicularis palpebrarum. See Appendix, note 594.

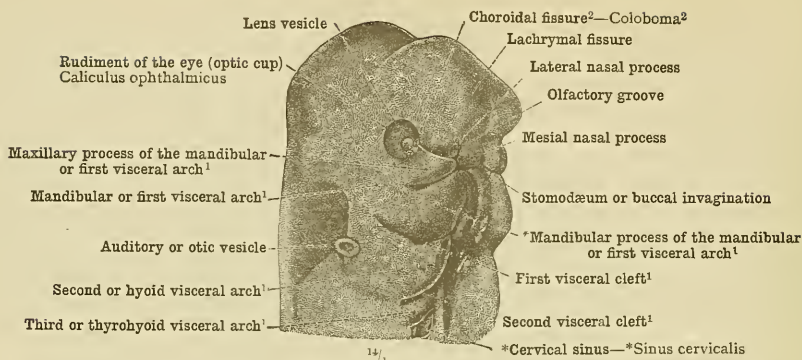


FIG. 1394.—HEAD OF A HUMAN EMBRYO AT OR NEAR THE END OF THE FOURTH WEEK OF INTRA-UTERINE LIFE. SEEN OBliquely FROM BEFORE AND THE RIGHT SIDE.

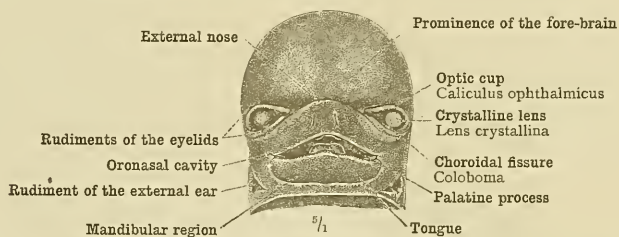


FIG. 1395.—THE HEAD OF A HUMAN EMBRYO AT THE END OF THE SIXTH WEEK OF INTRA-UTERINE LIFE. SEEN FROM BEFORE.

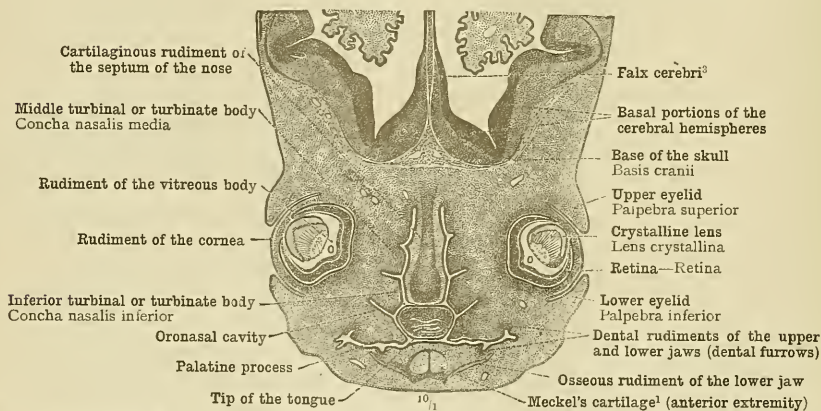


FIG. 1396.—CORONAL SECTION THROUGH THE FACE OF A HUMAN EMBRYO AT THE END OF THE EIGHTH WEEK OF INTRA-UTERINE LIFE.

¹ See Appendix, note 4th.

² See Appendix, note 5th.

³ Sometimes distinguished as the *falx major*.

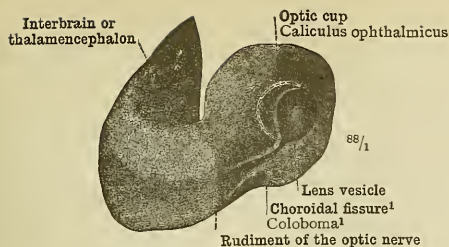


FIG. 1397.—MODEL OF THE OPTIC CUP WITH THE HOLLOW OPTIC STALK, THE LENS VESICLE, AND THE CHOROIDAL FISSURE; FROM A HUMAN EMBRYO OF TWENTY-SEVEN DAYS. (FROM FUCHS AND HOCHSTETTER'S "LEHRBUCH DER AUGENHEILKUNDE.")

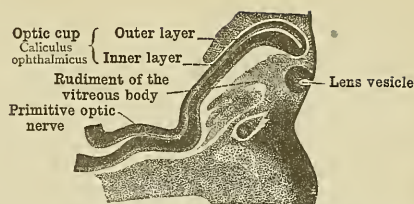


FIG. 1398.—LONGITUDINAL SECTION THROUGH THE OPTIC CUP AND THE RUDIMENT OF THE OPTIC NERVE OF THE EMBRYO DEPICTED IN FIG. 1394. THE SECTION PASSES THROUGH THE CHOROIDAL FISSURE.

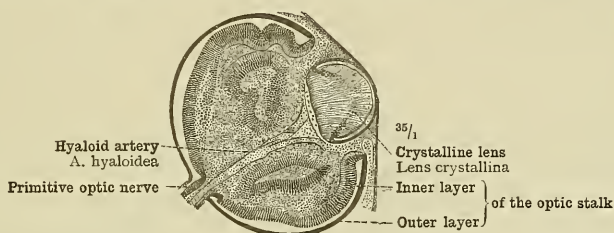


FIG. 1399.—HORIZONTAL SECTION THROUGH THE RIGHT EYE OF THE EMBRYO DEPICTED IN FIG. 1395. THE OPTIC CUP, CALCULUS OPHTHALMICUS, IN A LATER STAGE OF DEVELOPMENT.

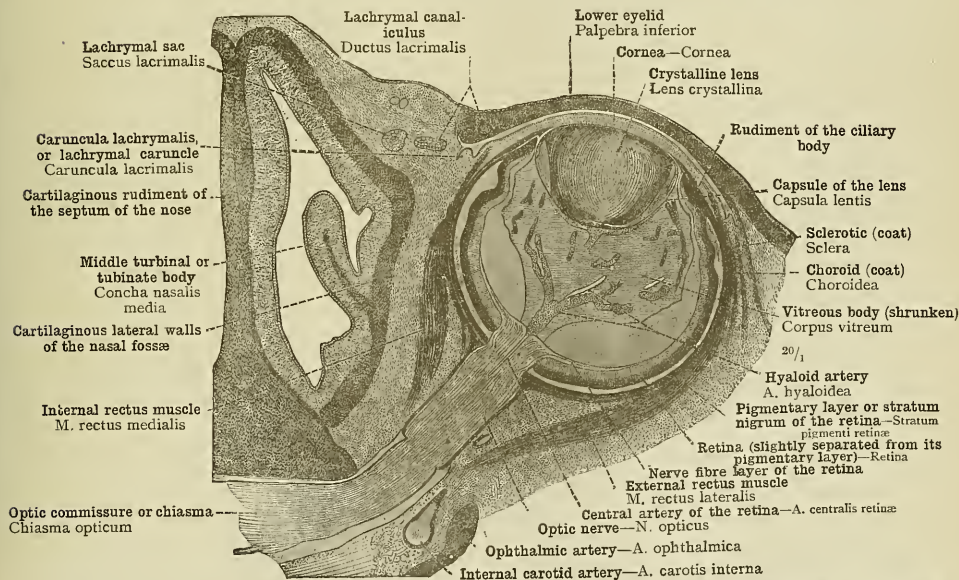


FIG. 1400.—HORIZONTAL SECTION THROUGH THE RIGHT EYE AND A PART OF THE NASAL FOSSAE OF A HUMAN EMBRYO OF NINE WEEKS.

¹ See Appendix, note 507.

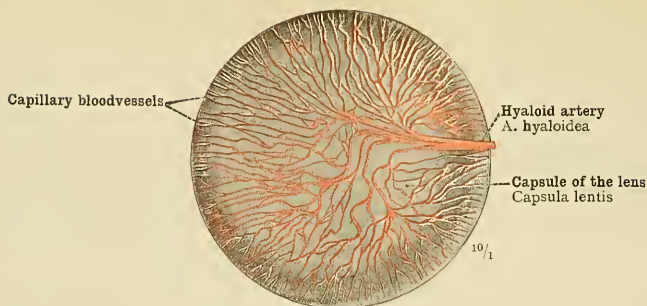


FIG. 1401.—THE RAMIFICATION OF THE HYALOID ARTERY, ARTERIA HYALOIDEA, ON THE POSTERIOR SURFACE OF THE LENS. FROM A HUMAN EMBRYO AT THE END OF THE FOURTH MONTH OF INTRA-UTERINE LIFE (MONTHS OF FOUR WEEKS EACH).

The bloodvessels have been injected.

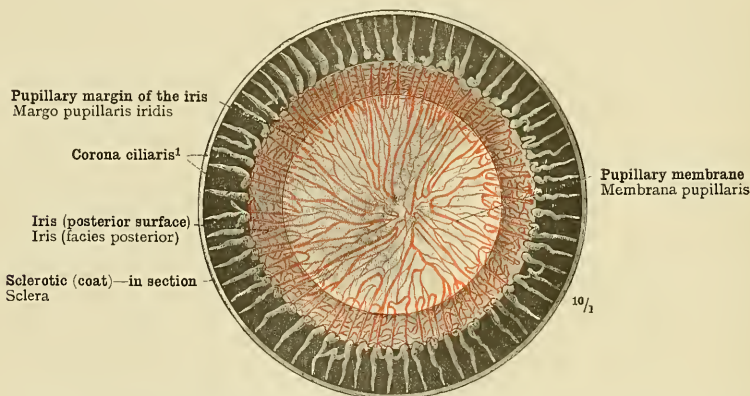


FIG. 1402.—THE BLOODVESSELS OF THE PUPILLARY MEMBRANE, MEMBRANA PUPILLARIS, AND OF THE IRIS. FROM A HUMAN EMBRYO AT THE END OF THE SIXTH MONTH OF INTRA-UTERINE LIFE (MONTHS OF FOUR WEEKS EACH).

The bloodvessels have been injected.

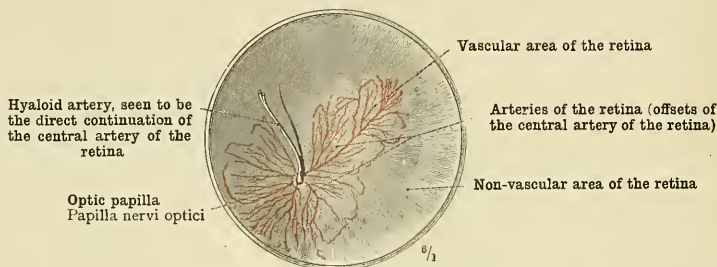


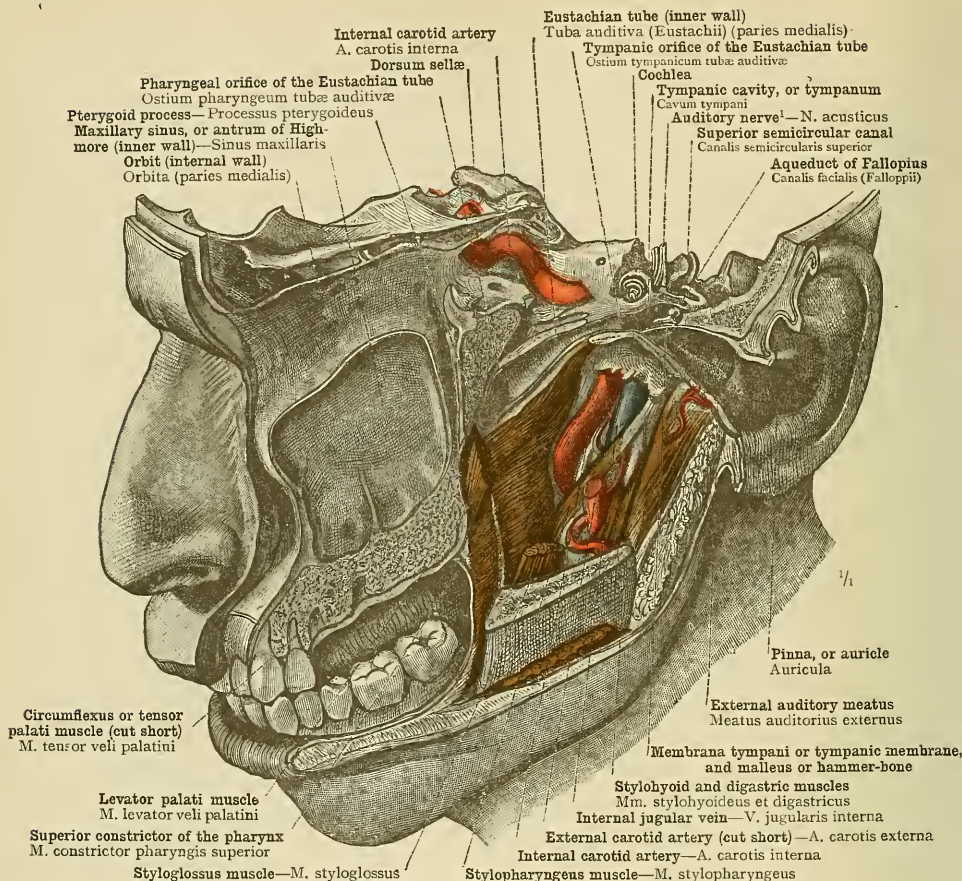
FIG. 1403.—THE OBLITERATED HYALOID ARTERY, ARTERIA HYALOIDEA, PASSING FREELY FORWARDS FROM THE CENTRE OF THE OPTIC PAPILLA, AND DISPLAYED BY THE REMOVAL OF THE VITREOUS BODY. THE VASCULAR SYSTEM OF THE RETINA. POSTERIOR SEGMENT OF THE EYEBALL OF A NEW-BORN KITTEN, SEEN FROM BEFORE.

The bloodvessels have been injected.

¹ See Appendix, note 485.

ORGANON AUDITUS

THE EAR

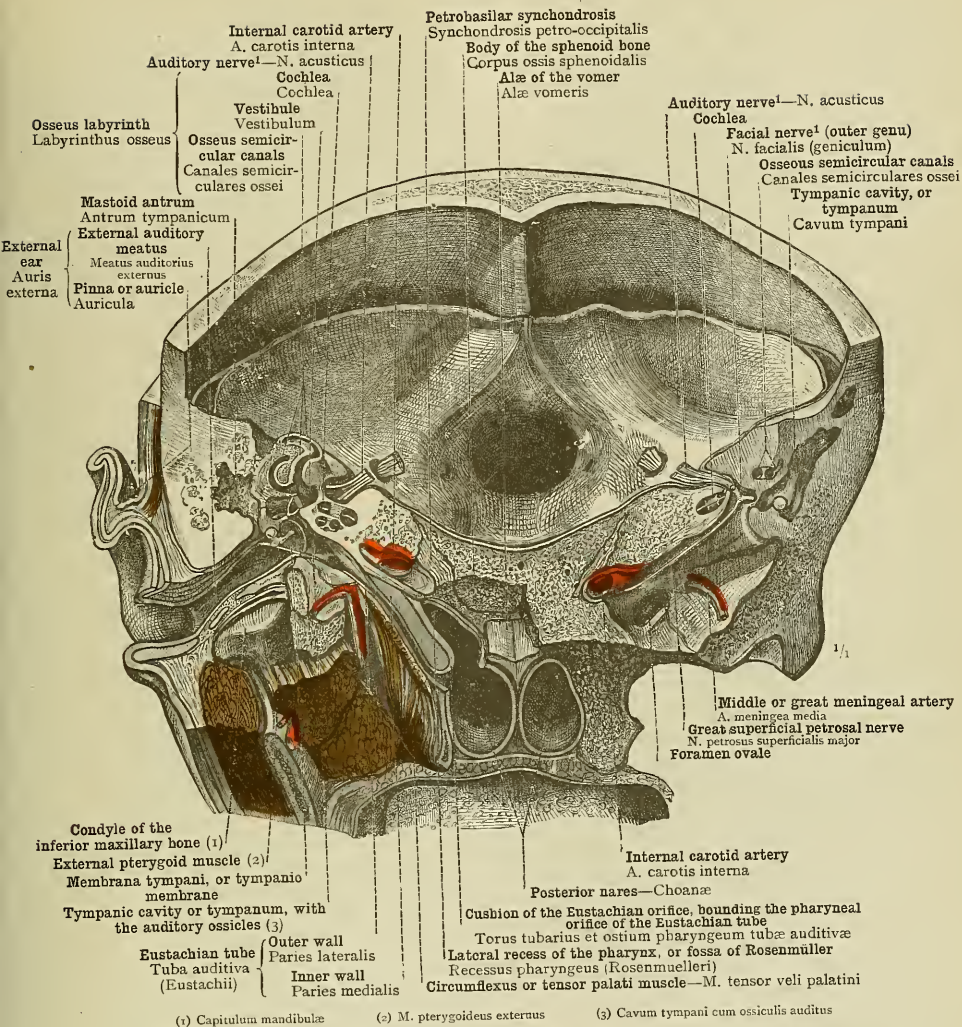


¹ Eighth cranial nerve in Soemmerring's enumeration: portio mollis of the seventh cranial nerve in that of Willis.

FIG. 1404.—GENERAL VIEW OF THE THREE PARTS OF THE ORGAN OF HEARING, SHOWING THEIR RELATIONS. SEEN FROM THE LEFT SIDE AND BEFORE. THE EXTERNAL EAR, AURIS EXTERNA: THE PINNA OR AURICLE, AURICULA, THE EXTERNAL AUDITORY MEATUS, MEATUS AUDITORIUS EXTERNUS, AND THE TYMPANIC MEMBRANE, MEMBRANA TYMPANI. THE MIDDLE EAR, AURIS MEDIA: THE TYMPANIC CAVITY OR TYMPANUM, CAVUM TYMPANI, AND THE EUSTACHIAN TUBE, TUBA AUDITIVA (EUSTACHII). THE INTERNAL EAR, AURIS INTERNA: THE LABYRINTH, LABYRINTHUS (AURIS), AND THE AUDITORY NERVE, NERVUS ACUSTICUS.

In a head hardened in alcohol a sagittal section was first made through the left superior maxillary bone and the left orbit, which behind, passing between the foramen rotundum and the foramen ovale, cut across the root of the great wing of the sphenoid and the internal pterygoid plate. The left ramus of the inferior maxillary bone having been cut away, a second section was made through the external auditory meatus and the tympanum, passing in front of the Eustachian tube and as far as the foramen lacerum medium; the Eustachian tube itself was opened by the removal of its outer wall as far as the pharyngeal orifice of the tube. The parts of the osseous labyrinth were exposed with the chisel.

General View of the Organ of Hearing.



¹ In Soemmerring's enumeration the facial is the seventh, the auditory is the eighth cranial nerve; in that of Willis the former is the *portio dura*, the latter the *portio mollis*, of the seventh cranial nerve.

FIG. 1405.—GENERAL VIEW OF THE THREE PARTS OF THE ORGAN OF HEARING. SEEN FROM ABOVE.

In a head hardened in chromic acid and alcohol, after the roof of the skull had been removed in the usual manner, a coronal section was made, passing through the hindmost part of the nasal septum and the foremost part of the soft palate. On the right side, by a saw-cut passing obliquely forwards, the parts of the organ of hearing situated in the petrous portion of the temporal bone were thinly opened, and the upper wall of the cartilaginous portion of the Eustachian tube was removed up to the opening of the tube into the nasopharynx. On the left side of the body the uppermost part of the petrous portion of the temporal bone with the roof of the tympanum was now removed.

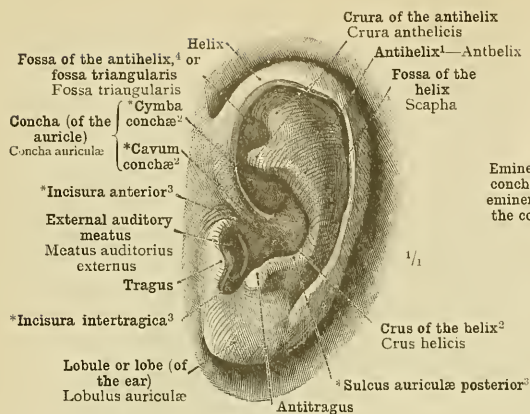


FIG. 1406.—THE LEFT PINNA OR AURICLE, AURICULA, OF A YOUNG WOMAN. OUTER SURFACE. HELIX AND ANTIHELIX¹; TRAGUS AND ANITRAGUS; CONCHA (OF THE AURICLE), CONCHA AURICULÆ; LOBULE OR LOBE (OF THE EAR), LOBULUS AURICULÆ.

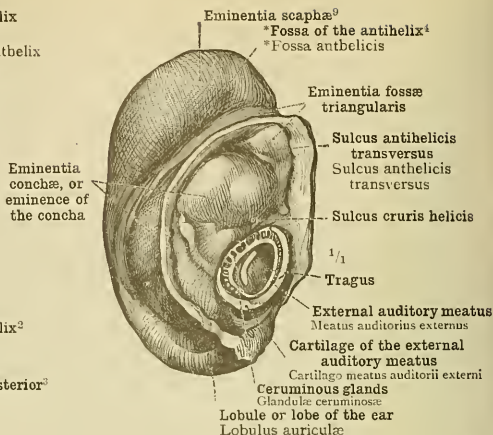


FIG. 1407.—THE INNER SURFACE OF THE SAME AURICLE.

The auricle was separated from the head along its line of attachment to the latter, and the cartilaginous portion of the external auditory meatus was cut across.

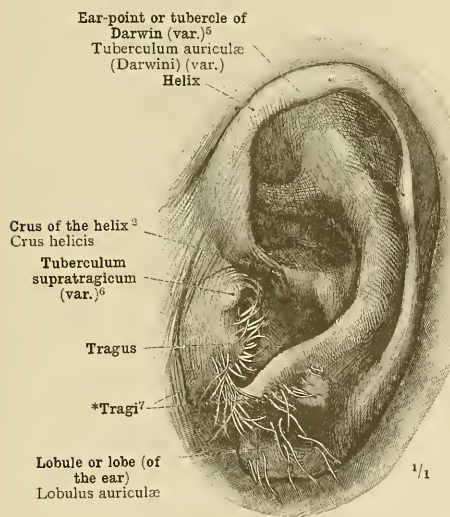


FIG. 1408.—THE LEFT PINNA OR AURICLE OF AN OLD MAN. OUTER SURFACE. *TRAGI?; EAR-POINT OR TUBERCLE OF DARWIN, TUBERCULUM AURICULÆ.⁶

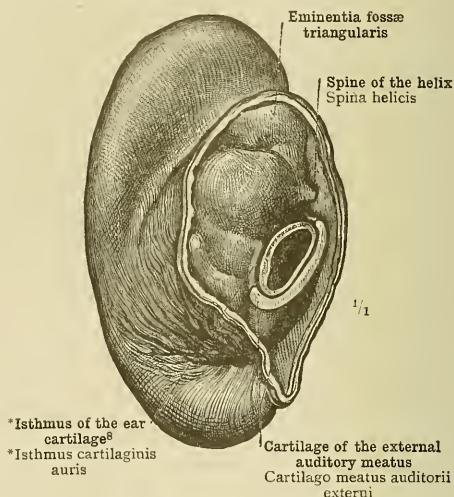


FIG. 1409.—THE INNER SURFACE OF THE SAME AURICLE.

The auricle was separated in the manner described at the foot of Fig. 1407.

¹ The spelling *antihelix* is used sometimes in England also.

² These terms are used neither by Quain nor by Macalister.

³ See Appendix, note 39^a.

⁴ Sometimes called *Woolner's tip*, Darwin's attention having been drawn to this prominence by the sculptor Woolner.

⁵ A rounded prominence sometimes met with on the upper part of the tragus.

⁶ The name of "*tragi*" is given to the short, stiff hairs with which the entrance to the external auditory meatus is sometimes beset in elderly persons. The term is, however, rarely used in England.

⁷ This term is not used by Quain or Macalister. Examination of Fig. 1409 will show its signification.

⁸ The *eminentia scaphæ* is the eminence on the inner surface of the auricle corresponding to the *fossa of the helix* or *scapha* on the outer surface.

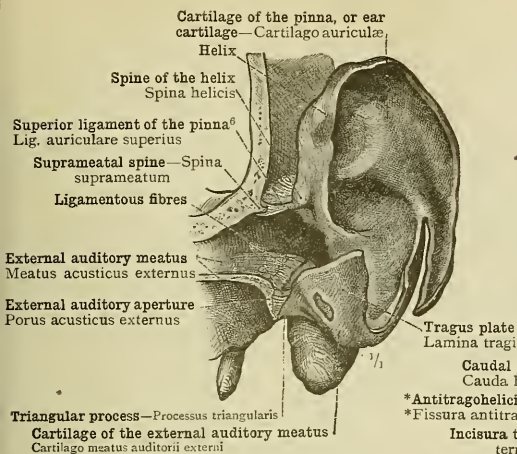


FIG. 1410.—THE CARTILAGE OF THE PINNA, OR EAR CARTILAGE, AND THE CARTILAGE OF THE EXTERNAL AUDITORY MEATUS, IN CONNEXION WITH THE TYMPANIC PORTION OF THE TEMPORAL BONE. LEFT EAR. OUTER SURFACE. SEEN FROM BEFORE.

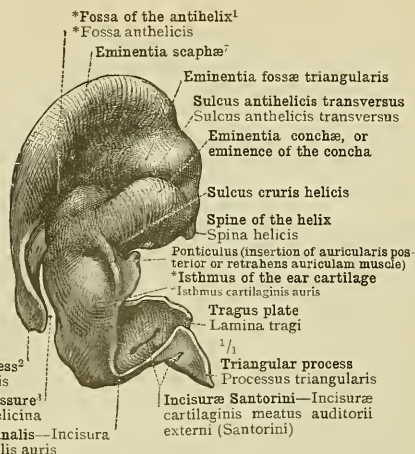


FIG. 1411.—THE CARTILAGE OF THE PINNA, OR EAR CARTILAGE, AND THE CARTILAGE OF THE EXTERNAL AUDITORY MEATUS. CARTILAGO AURICULÆ ET CARTILAGO MEATUS AUDITORII EXTERNI. LEFT EAR. INNER SURFACE. SEEN FROM BEHIND.

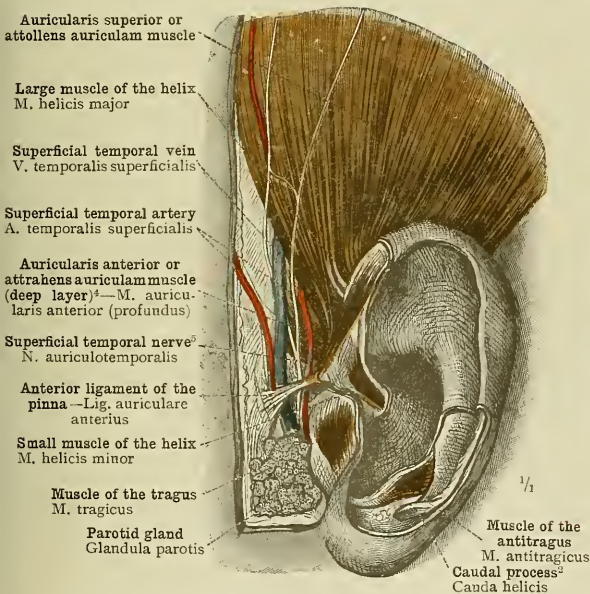


FIG. 1412.—THE MUSCLES (EXTRINSIC AND INTRINSIC) ON THE OUTER SURFACE OF THE PINNA OR AURICLE. LEFT EAR.

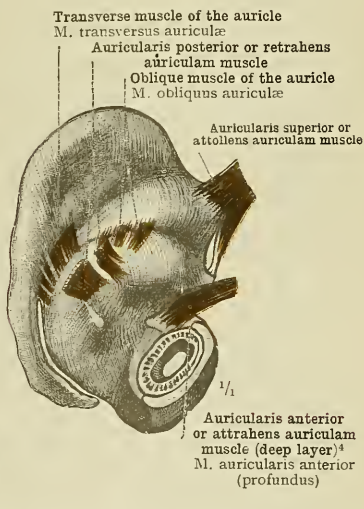


FIG. 1413.—THE MUSCLES (EXTRINSIC AND INTRINSIC) ON THE INNER SURFACE OF THE PINNA OR AURICLE. LEFT EAR.

¹ See Appendix, note 590.

² By Macalister named *cauda helices posterior*.

³ This term is not used by Quain or by Macalister.

⁴ See Appendix, note 510.

⁵ See Appendix, note 459.

⁶ Quain enumerates *anterior* and *posterior* ligaments only, making no mention of the *superior* ligament of the pinna.

⁷ See note 2 to p. 920.

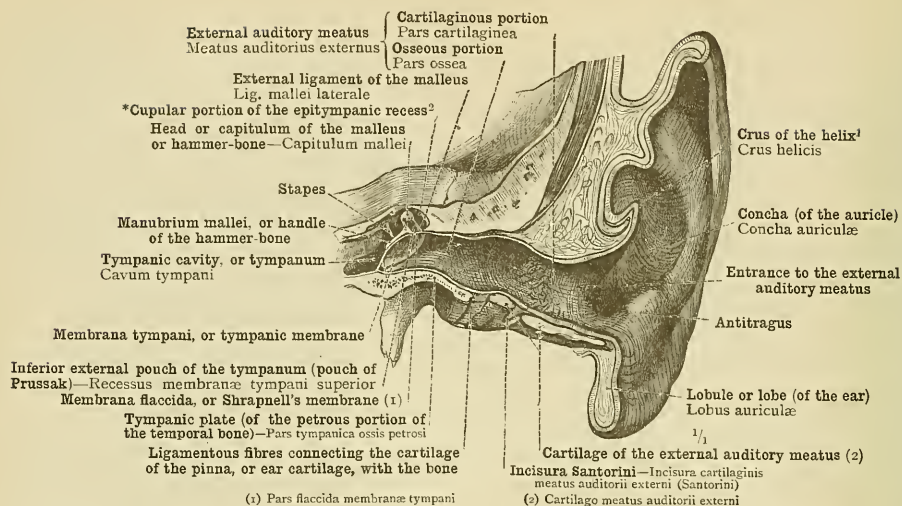


FIG. 1414.—THE LEFT EXTERNAL AUDITORY MEATUS, MEATUS AUDITORIUS EXTERNUS, WITH THE MEMBRANA TYMPANI OR TYMPANIC MEMBRANE, CUT ACROSS PERPENDICULARLY THROUGHOUT ITS WHOLE LENGTH. THE CARTILAGINOUS AND OSSEOUS PORTIONS OF THE EXTERNAL AUDITORY MEATUS, PARS CARTILAGINEA ET PARS OSSEA MEATUS AUDITORIUS EXTERNI. THE EXPANSION OF THE EXTERNAL AUDITORY MEATUS INTO THE PINNA OR AURICLE, AND ITS CLOSURE BY THE MEMBRANA TYMPANI. SEEN FROM BEFORE.

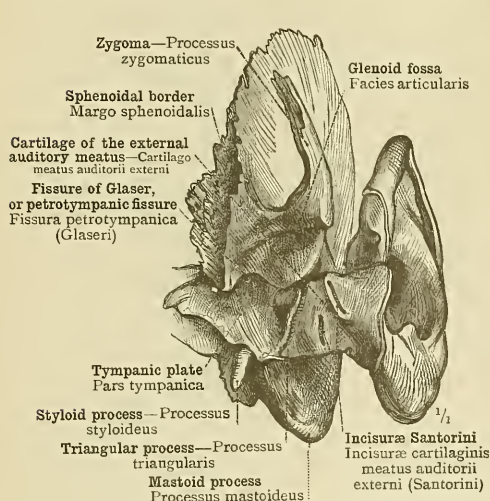


FIG. 1415.—THE WALL OF THE OSSEOUS AND CARTILAGINOUS PORTIONS OF THE EXTERNAL AUDITORY MEATUS LAID BARE. SEEN FROM BELOW AND BEFORE. LEFT EAR.

* See Appendix, note 508.

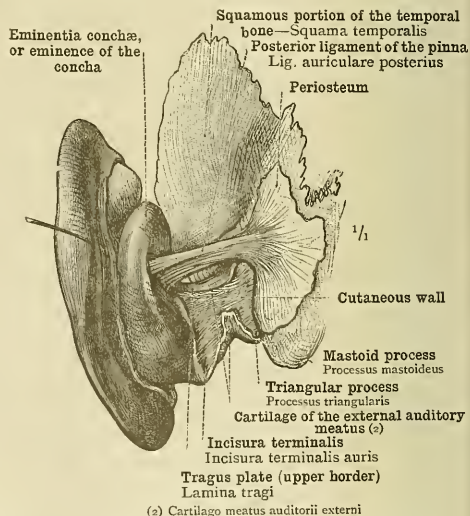


FIG. 1416.—THE WALL OF THE CARTILAGINOUS PORTION OF THE EXTERNAL AUDITORY MEATUS LAID BARE. SEEN FROM BEHIND. LEFT EAR.

° See Appendix, note 511.

Auris externa—The external ear.—Meatus auditorius externus—The external auditory meatus.

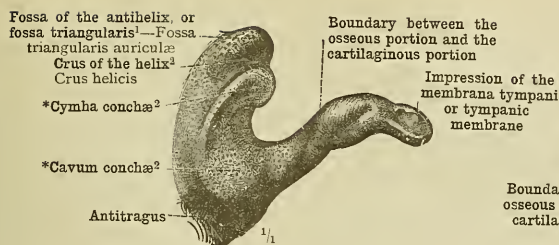


FIG. 1417.—SEEN FROM BEHIND.

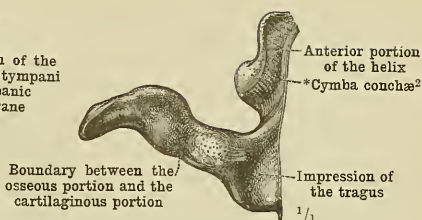


FIG. 1418.—SEEN FROM BEFORE.

CAST OF THE LEFT EXTERNAL AUDITORY MEATUS AND THE ADJOINING PORTIONS OF THE PINNA OR AURICLE, TAKEN WITH FUSIBLE METAL. SHAPE AND DIMENSIONS OF THE EXTERNAL AUDITORY MEATUS.

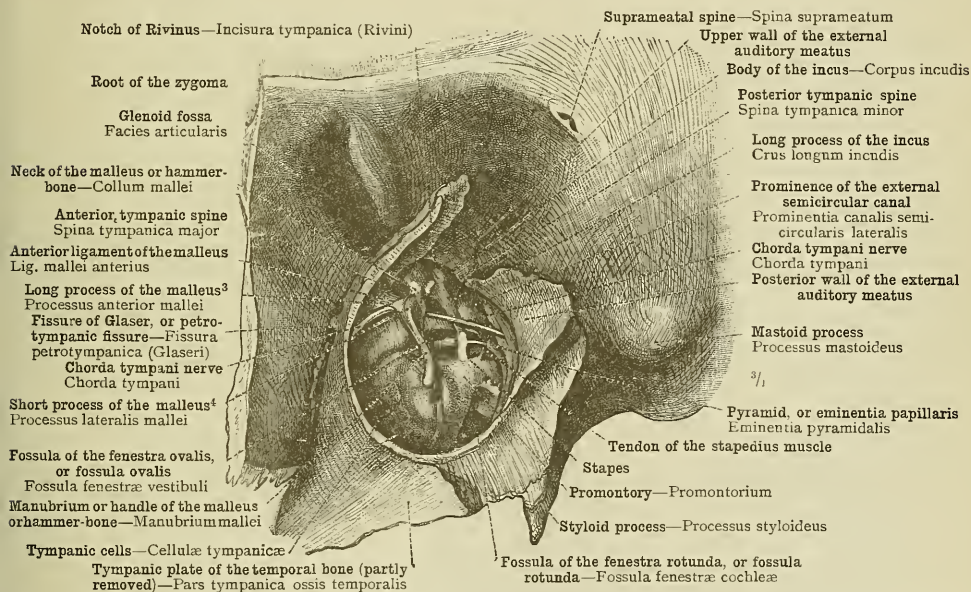


FIG. 1419.—THE INNERMOST PORTION OF THE EXTERNAL AUDITORY MEATUS AND THE RELATION THEREOF OF THE STRUCTURES IN THE TYMPANIC CAVITY OR TYMPANUM, DISPLAYED BY THE REMOVAL OF THE GREATER PART OF THE EXTERNAL AUDITORY MEATUS AND OF THE MEMBRANA TYMPANI OR TYMPANIC MEMBRANE. VIEW INTO THE TYMPANIC CAVITY OR TYMPANUM; THE THREE AUDITORY OSSICLES ARE SEEN IN THEIR NATURAL POSITION; THE TENDON OF THE STAPEDIUS MUSCLE AND THE CHORDA TYMPANI NERVE ARE ALSO VISIBLE, AS WELL AS THE PARTS ON THE INNER WALL, PARIETES LABYRINTHICUS, OF THE TYMPANIC CAVITY. LEFT EAR.

¹ See Appendix, note 509.

² See Appendix, note 508.

³ Also called *processus gracilis* vel *Folianus mallei*.

⁴ Also called *processus brevis* vel *obtusus mallei*.

Auris externa—The external ear.—Meatus auditorius externus—The external auditory meatus.

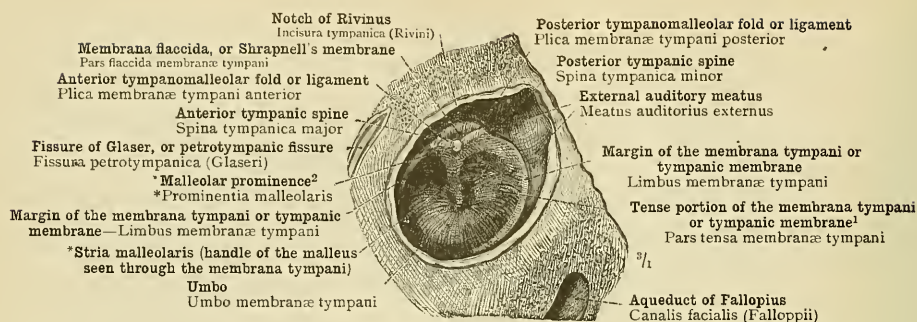


FIG. 1420.—OUTER SURFACE OF THE LEFT MEMBRANA TYMPANI OR TYMPANIC MEMBRANE. The external auditory meatus has been removed by a saw-cut passing close to the tympanic membrane in a plane parallel to the plane of that membrane.

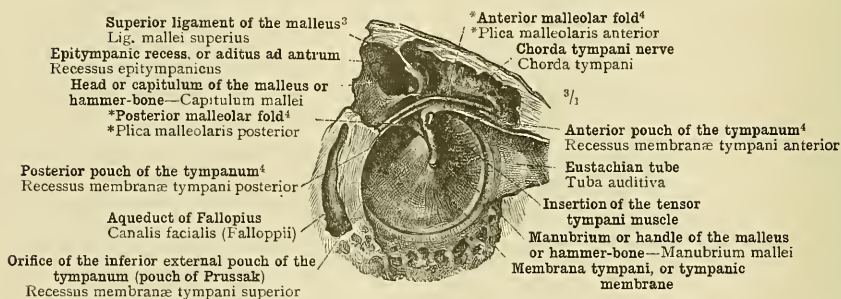


FIG. 1421.—INNER OR TYMPANIC SURFACE OF THE LEFT MEMBRANA TYMPANI OR TYMPANIC MEMBRANE, WITH THE ANTERIOR AND POSTERIOR TYMPANIC POUCHES (OF TRÖLTSCHE), RECESSUS MEMBRANÆ TYMPANI ANTERIOR ET POSTERIOR.

Displayed by a saw-cut traversing the tympanum close to the tympanic membrane in a plane parallel to the plane of that membrane, and by the removal of the incus.

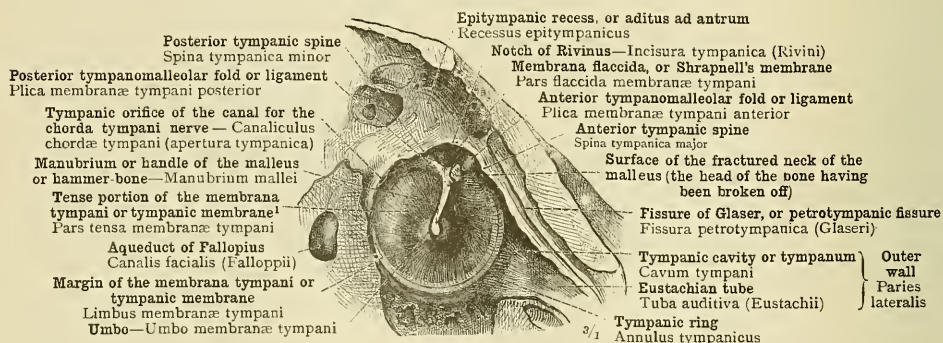


FIG. 1422.—INNER OR TYMPANIC SURFACE OF THE LEFT MEMBRANA TYMPANI OR TYMPANIC MEMBRANE.

In order to lay bare the membrana flaccida (pars flaccida membranæ tympani) the head of the malleus was removed, together with the adjoining folds of the mucous membrane.

¹ See Appendix, note 512.

² See Appendix, note 513.

³ Sometimes called the *suspensory ligament of the malleus*.

⁴ See Appendix, note 514.

Auris externa—The external ear.—Membrana tympani—The tympanic membrane.

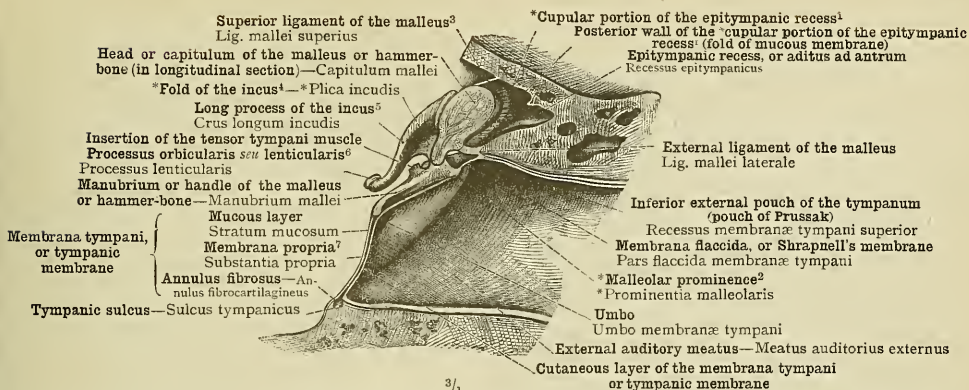


FIG. 1423.—CORONAL SECTION THROUGH THE LEFT MEMBRANA TYMPANI OR TYMPANIC MEMBRANE AND THE ADJOINING PORTION OF THE EXTERNAL AUDITORY MEATUS, IN A SPECIMEN FIRST HARDENED IN CHROMIC ACID AND ALCOHOL AND SUBSEQUENTLY DECALCIFIED IN HYDROCHLORIC ACID. THE SECTION PASSES THROUGH THE HEAD OR CAPITULUM OF THE MALLEUS OR HAMMER-BONE, AND LEAVES THE MANUBRIUM OR HANDLE OF THAT BONE INTACT BEHIND THE PLANE OF SECTION. SEEN FROM BEFORE. THE MUCOUS MEMBRANE OF THE RECESSUS EPITYMPANICUS OR ADITUS AD ANTRUM.

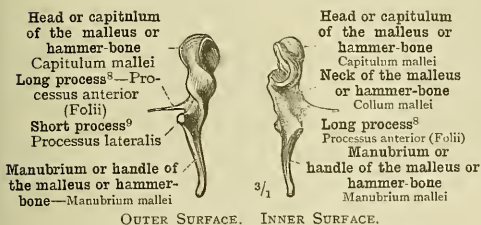


FIG. 1424.—THE LEFT MALLEUS OR HAMMER-BONE.

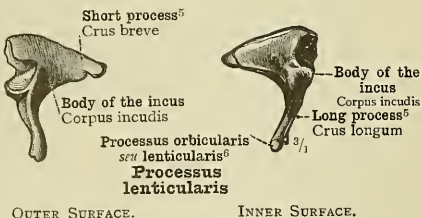


FIG. 1425.—THE LEFT INCUS.

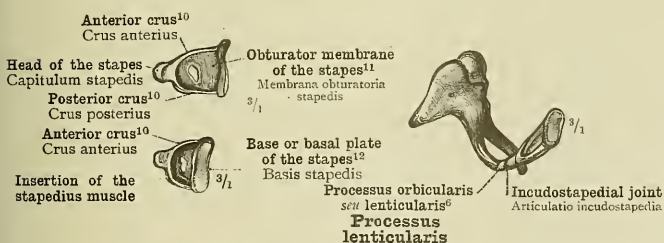


FIG. 1426.—THE LEFT STAPES, WITH THE OBTURATOR MEMBRANE,¹¹ SEEN OBLIQUELY FROM THE UPPER AND INNER SIDE.

FIG. 1427.—THE AUDITORY OSSICLES OF THE LEFT EAR, SEEN FROM BEHIND IN THEIR NATURAL POSITION.

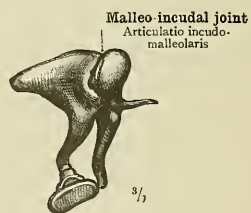


FIG. 1428.—THE AUDITORY OSSICLES OF THE LEFT EAR, SEEN FROM ABOVE IN THEIR NATURAL POSITION.

¹ See Appendix, note 513.

² See Appendix, note 513.

³ Sometimes called the *suspensory ligament of the malleus*.

⁴ See Appendix, note 515.

⁵ The processes of the incus are often known in England by their Latin names of *crus longum* and *crus breve*.

⁶ See Appendix, note 515.

⁷ See Appendix, note 517.

⁸ Also known as the *processus gracilis* vel *foliatus*.

⁹ Also known as the *processus brevis* vel *obtusus*.

¹⁰ See Appendix, note 516.

¹¹ See Appendix, note 519.

¹² Sometimes called the *foot-plate of the stapes*.

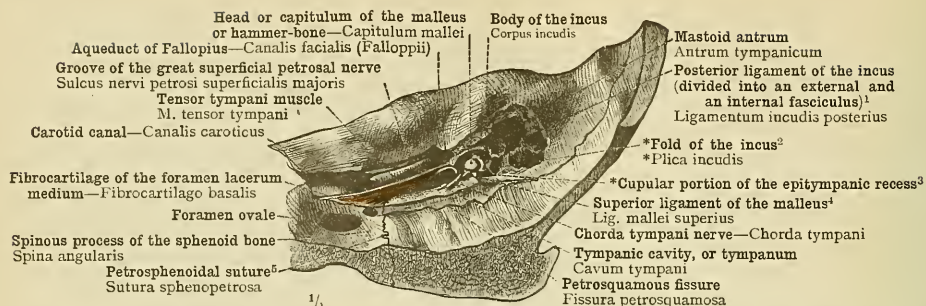


FIG. 1429.—THE LEFT TYMPANIC CAVITY OR TYMPANUM, CAVUM TYMPANI, OPENED BY THE REMOVAL OF ITS ROOF,⁶ PARS TEGMENTALIS. SEEN FROM ABOVE. TENSOR TYMPANI MUSCLE.

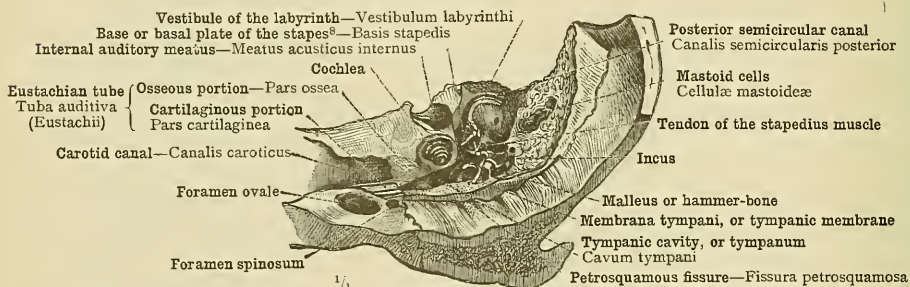


FIG. 1430.—THE LEFT TYMPANUM OR TYMPANIC CAVITY, AND ITS RELATION TO THE LABYRINTH, DISPLAYED BY THE REMOVAL OF THE UPPER PART OF THE PETROUS PORTION OF THE TEMPORAL BONE. SEEN FROM ABOVE.

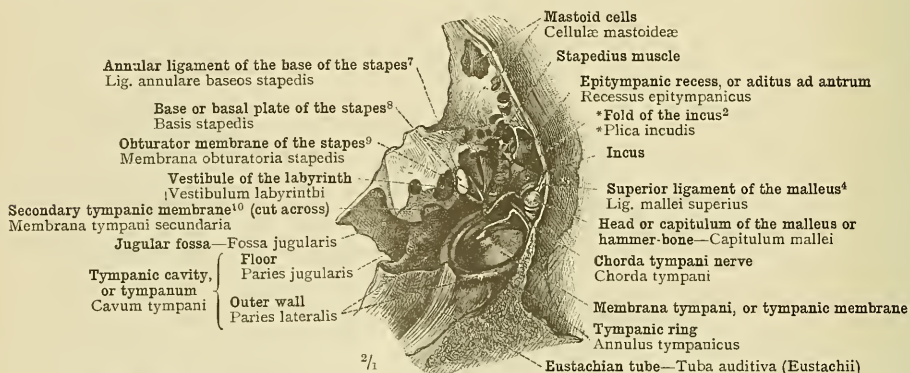


FIG. 1431.—THE LEFT TYMPANUM OR TYMPANIC CAVITY, WITH THE MEMBRANA TYMPANI OR TYMPANIC MEMBRANE, THE AUDITORY OSSICLES, AND THE STAPEDIUS MUSCLE. SEEN FROM ABOVE.

¹ See Appendix, note 520.

² See Appendix, note 515.

³ See Appendix, note 514.

⁴ Known also as the *suspensory ligament of the malleus*.

⁵ See Appendix, note 521.

⁶ See Appendix, note 522.

⁷ Also known as the *membrane of the fenestra ovalis*.

⁸ Also known as the *foot-plate of the stapes*.

⁹ See Appendix, note 519.

¹⁰ See Appendix, note 523.

Auris media—The middle ear.—Cavum tympani—The tympanic cavity or tympanum.

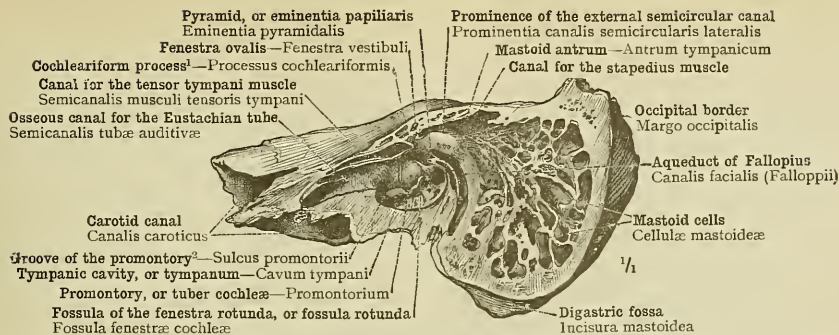


FIG. 1432.—THE INNER WALL, PARIET LABYRINTHICUS, OF THE LEFT TYMPANIC CAVITY (OSSEOUS SURFACE), AND THE MASTOID CELLS, CELLULÆ MASTOIDEÆ, DISPLAYED BY A SECTION PASSING THROUGH THE MASTOID PROCESS AND THE FRONT OF THE PETROUS PORTION OF THE TEMPORAL BONE. SEEN FROM BEFORE AND THE OUTER SIDE

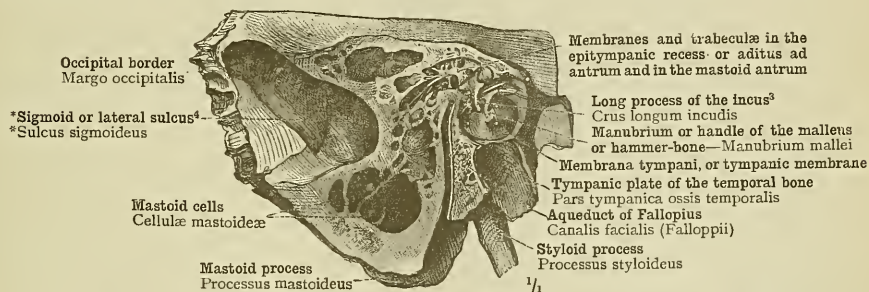


FIG. 1433.—THE OUTER WALL, PARIET MEMBRANACEUS, OF THE LEFT TYMPANIC CAVITY, AND THE ENTRANCE TO THE MASTOID CELLS. THE MASTOID ANTRUM, ANTRUM TYMPANICUM, IS TRAVERSED BY BRANCHING TRABECULÆ OF CONNECTIVE TISSUE. SEEN FROM THE INNER SIDE.

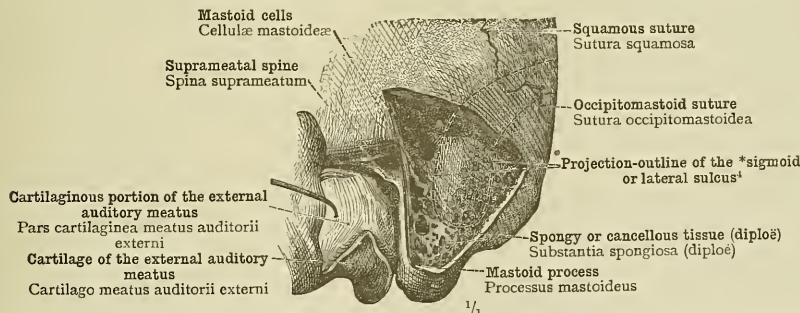


FIG. 1434.—THE MASTOID CELLS IN RELATION TO THE EXTERNAL AUDITORY MEATUS AND TO THE *SIGMOID OR LATERAL SINUS.¹ THE PROJECTION-OUTLINE OF THE SINUS IS INDICATED BY AN INTERRUPTED LINE. LEFT EAR. SEEN FROM THE OUTER SIDE.

The mastoid cells are in this specimen but slightly developed.

¹ See Appendix, note 524.

² See Appendix, note 525.

³ Often known in England also by the Latin name of *crus longum incudis*.

⁴ Regarding the use of the term *sigmoid sulcus, lodging the *sigmoid sinus, see note 524 to Part V. In Part I. the usual English name of lateral sulcus only was employed (see Fig. 329, p. 63).

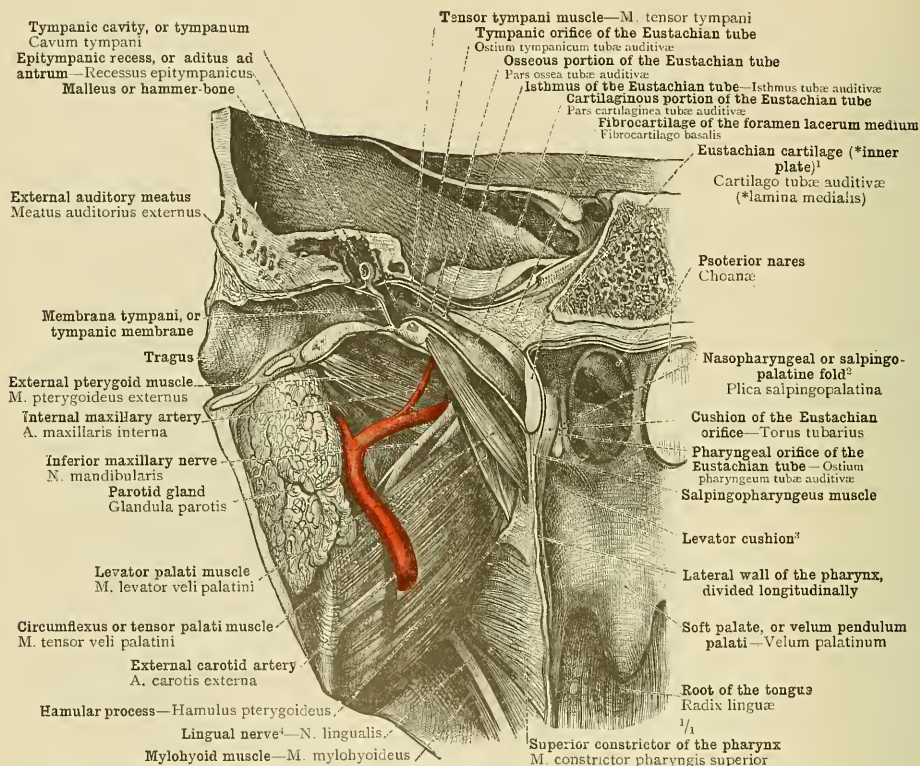
¹ See Appendix, note 505.² See Appendix to Part IV., note 4.³ See Appendix, note 597.⁴ Formerly known also as the *gustatory nerve*.

FIG. 1435.—THE EUSTACHIAN TUBE, TUBA AUDITIVA (EUSTACHII), WITH THE TYMPANIC CAVITY OR TYMPANUM AND THE EXTERNAL AUDITORY MEATUS, SEEN FROM BEHIND.

in the anterior segment of a head divided in the direction of the external auditory meatus, the left Eustachian tube was exposed from behind up to the lateral wall of the pharynx, and was opened by the removal of its inner wall. Of the *inner plate (see Appendix, note 505) of the Eustachian cartilage, the uppermost portion only, divided longitudinally, and the foremost portion, which is imbedded in the wall of the pharynx and thus forms the cushion of the Eustachian orifice, torus tubarius, have been preserved. The levator palati muscle, musculus levator veli palatini, the circumflexus, or tensor palati muscle, musculus tensor veli palatini, the superior constrictor of the pharynx, musculus constrictor pharyngis superior, the external and internal pterygoid muscles, musculi pterygoidei, externus and internus, the arteries and nerves passing between the last-named muscles, and the posterior surface of the parotid gland, were then exposed. Finally, the pharynx was opened by the removal of its posterior wall, so that its left lateral wall is seen in longitudinal section, and the cushion of the Eustachian orifice and the pharyngeal orifice of the Eustachian tube, situate just in front of this eminence, are also visible.

Auris media—The middle ear.—Tuba auditiva—The Eustachian tube.

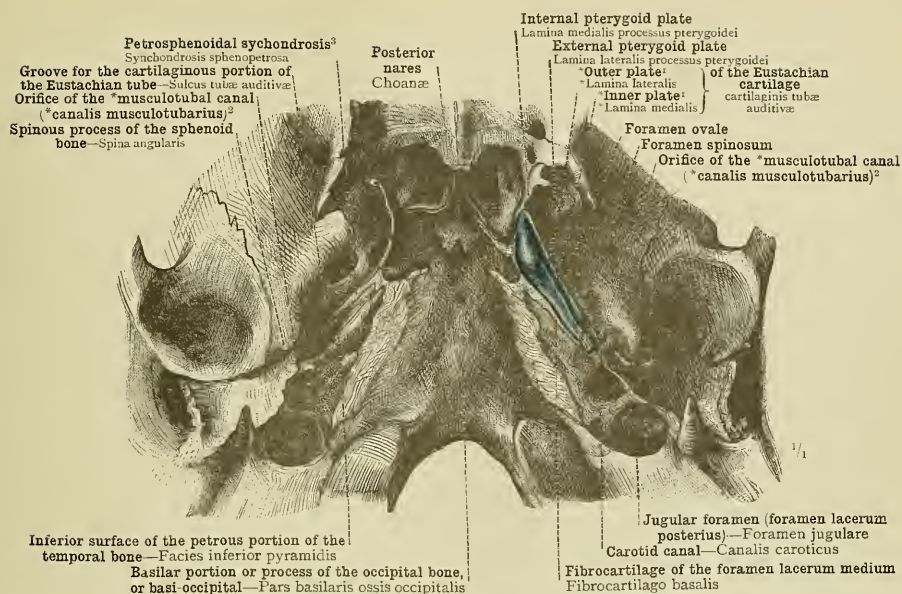


FIG. 1436.—A PART OF THE OUTER OR INFERIOR SURFACE OF THE BASE OF THE SKULL, ON THE LEFT SIDE OF WHICH THE EUSTACHIAN CARTILAGE, CARTILAGO TUBÆ AUDITIVÆ, IS EXPOSED IN ITS NATURAL POSITION AND WITH ITS NATURAL CONNEXIONS WITH THE BONES. ON THE RIGHT SIDE THE GROOVE FOR THE CARTILAGINOUS PORTION OF THE EUSTACHIAN TUBE, SULCUS TUBÆ AUDITIVÆ, IS LAID BARE.

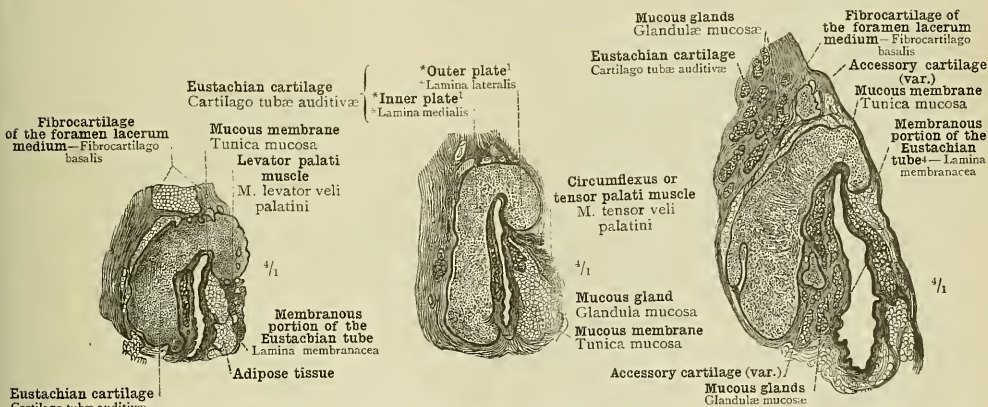


FIG. 1437.—NEAR THE OSSEOUS PORTION.

FIG. 1438.—MIDDLE OF THE CARTILAGINOUS PORTION.

FIG. 1439.—NEAR THE PHARYNGEAL ORIFICE.

TRANSVERSE SECTIONS OF THE CARTILAGINOUS PORTION OF THE EUSTACHIAN TUBE, PARS CARTILAGINEA TUBÆ AUDITIVÆ.

¹ See Appendix, note 526.

² See Appendix, note 528.

³ See Appendix, note 524.

⁴ See Appendix, note 526.

Auris media—The middle ear.—Tuba auditiva—The Eustachian tube.

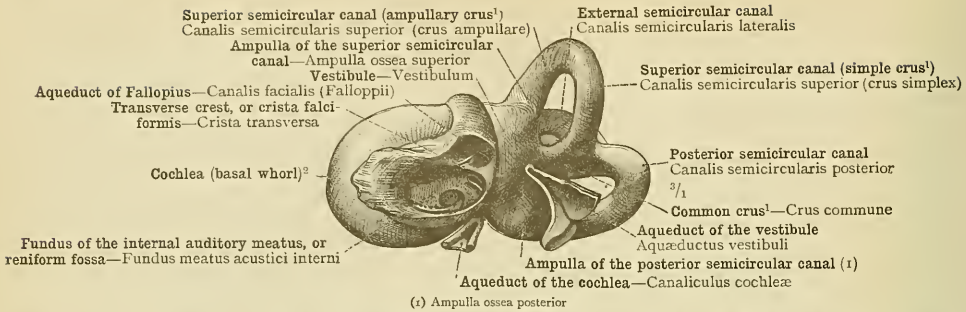


FIG. 1440.—THE OSSEOUS LABYRINTH, LABYRINTHUS OSSEUS, OF THE RIGHT EAR, WITH THE INTERNAL AUDITORY MEATUS, SEEN FROM BEHIND. THE AQUEDUCT OF THE VESTIBULE, AQUEDUCTUS VESTIBULI, AND THE AQUEDUCT OF THE COCHLEA, CANALICULUS COCHLEÆ.

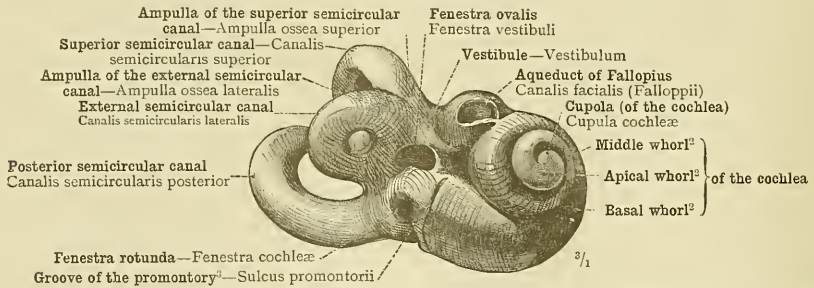


FIG. 1441.—THE OSSEOUS LABYRINTH OF THE RIGHT EAR, SEEN FROM BEFORE. THE FENESTRA OVALIS (FENESTRA VESTIBULI) AND THE FENESTRA ROTUNDA (FENESTRA COCHLEÆ); THE PART OF THE AQUEDUCT OF FALLOPIUS (CANALIS FACIALIS FALLOPPII) ADJACENT TO THE COCHLEA.

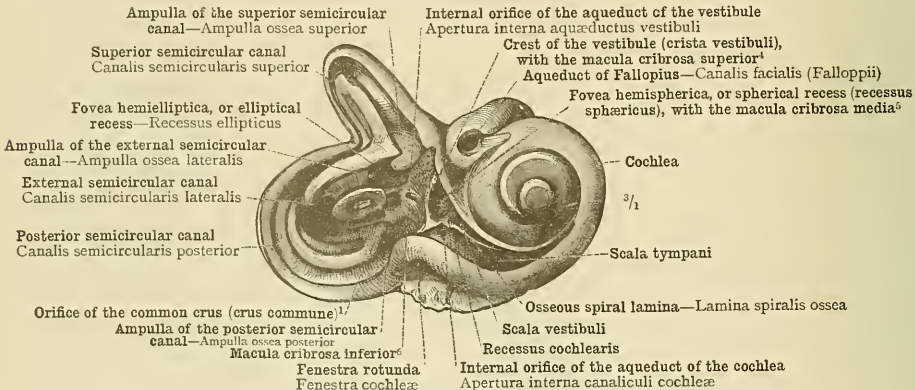


FIG. 1442.—THE OSSEOUS LABYRINTH OF THE RIGHT EAR, SEEN FROM BEFORE. THE OUTER WALL OF THE VESTIBULE HAS BEEN REMOVED, AND THE SEMICIRCULAR CANALS HAVE BEEN OPENED THROUGHOUT THEIR ENTIRE LENGTH. INNER SURFACE OF THE INNER AND POSTERIOR WALLS OF THE VESTIBULE, AND THE ORIFICES OF THE SEMICIRCULAR CANALS.

¹ See Appendix, note 579.

⁴ See Appendix, note 537.

² See Appendix, note 539.

⁵ See Appendix, note 539.

³ See Appendix, note 575.

⁶ See Appendix, note 533.

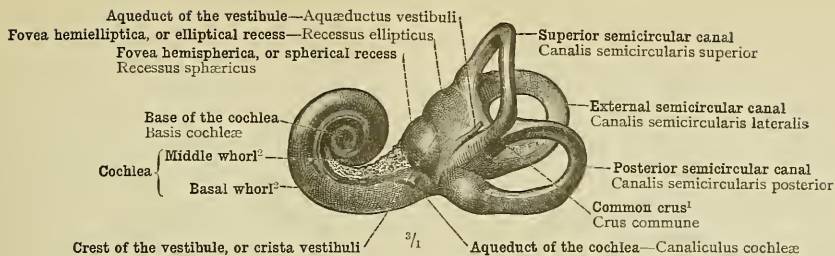


FIG. 1443.—CAST OF THE INTERIOR OF THE RIGHT OSSEOUS LABYRINTH, TAKEN WITH FUSIBLE METAL. SEEN FROM BEHIND.

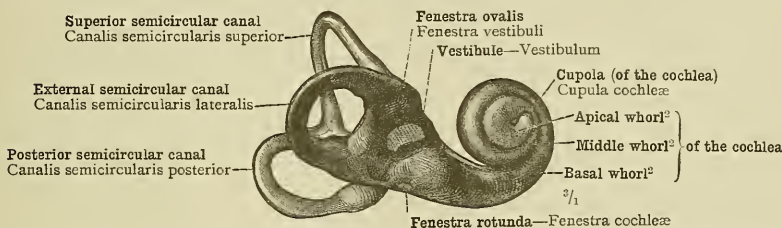


FIG. 1444.—CAST OF THE INTERIOR OF THE RIGHT OSSEOUS LABYRINTH, TAKEN WITH FUSIBLE METAL. SEEN FROM BEFORE.

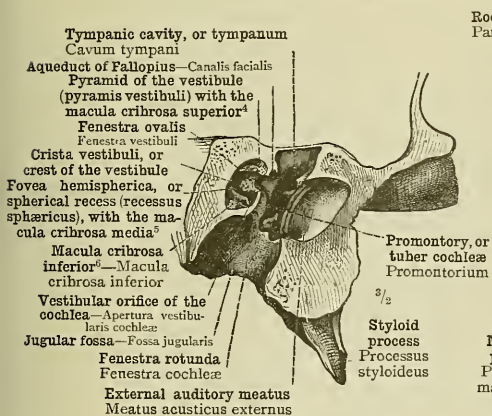


FIG. 1445.—ANTERIOR SEGMENT OF THE TEMPORAL BONE, WITH THE ANTERIOR PORTION OF THE VESTIBULE. THE MACULÆ CRIBROSE (see Appendix, notes ⁵³¹, ⁵³², and ⁵³³); THE VESTIBULAR ORIFICE OF THE COCHLEA.

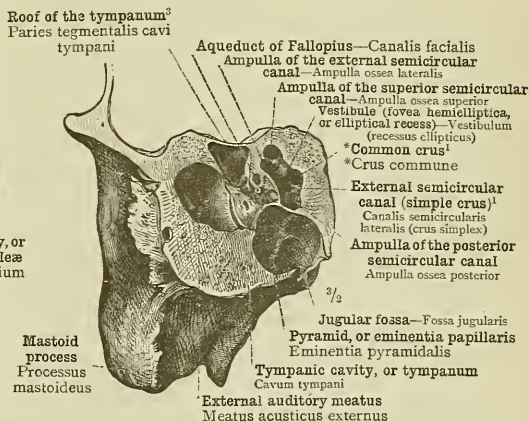


FIG. 1446.—POSTERIOR SEGMENT OF THE TEMPORAL BONE, WITH THE POSTERIOR PORTION OF THE VESTIBULE. THE ORIFICES OF THE SEMICIRCULAR CANALS.

A right temporal bone was divided by a frontal saw-cut, which cut transversely across the promontory or tuber cochleæ, the fenestra ovalis, and the vestibule of the labyrinth. The bone was thus divided into anterior and posterior segments.

¹ See Appendix, note ⁵³⁹.

⁴ See Appendix, note ⁵³⁴.

² See Appendix, note ⁵³⁹.

⁵ See Appendix, note ⁵³⁹.

³ See Appendix, note ⁵³².

⁶ See Appendix, note ⁵³³.

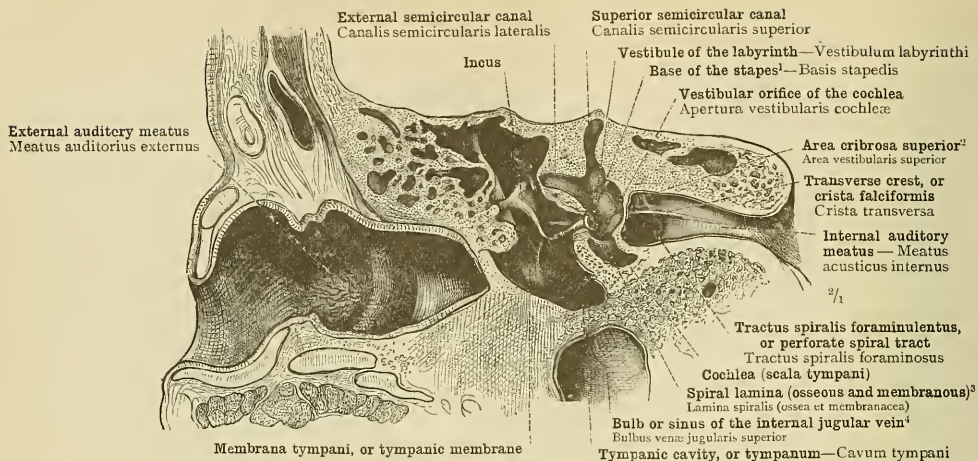


FIG. 1447.—THE VESTIBULE OF THE LABYRINTH, SHOWN IN RELATION TO THE TYMPANIC CAVITY OR TYMPANUM AND TO THE FUNDUS OF THE INTERNAL AUDITORY MEATUS OR RENIFORM FOSSA.

A section, nearly coronal in direction, was made through the left organ of hearing, dividing the external and the internal auditory meatus in the direction of the long axis of these canals. The anterior segment seen from behind.

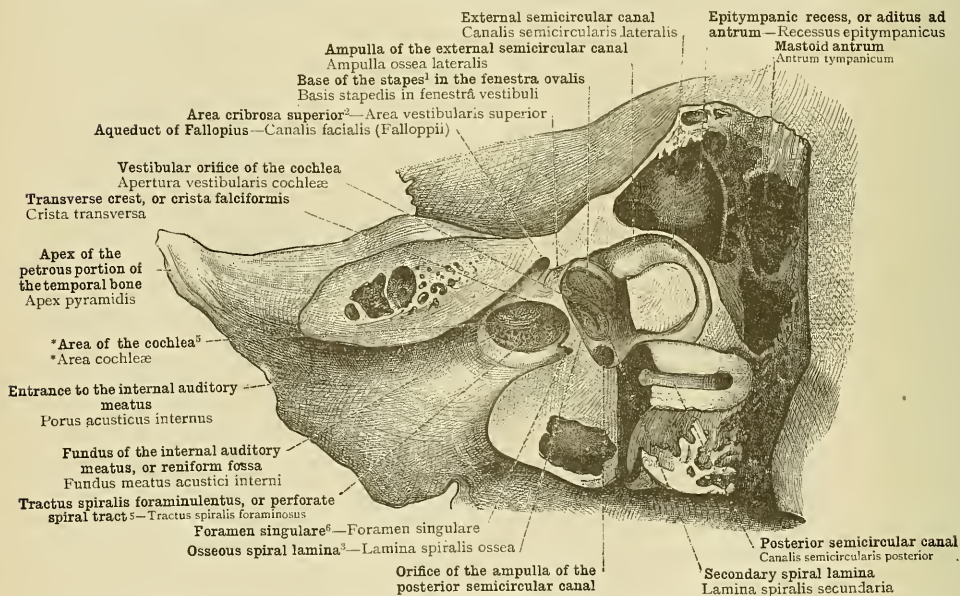


FIG. 1448.—THE VESTIBULE OF THE LABYRINTH WITH THE EXTERNAL SEMICIRCULAR CANAL, THE UPPER LIMB (*CRUS SIMPLEX—see Appendix, note 529) OF THE POSTERIOR SEMICIRCULAR CANAL, AND THE INTERNAL AUDITORY MEATUS, EXPOSED FROM ABOVE IN THE PETROUS PORTION OF THE RIGHT TEMPORAL BONE. SEEN OBliquely FROM ABOVE AND BEHIND.

¹ Also called the *basal plate*, or *foot-plate*, of the stapes.

² See Appendix, note 531.

³ The Latin names, *lamina spiralis ossea* and *lamina spiralis membranacea*, are also quite commonly used in England.

⁴ See Appendix to Part V., note 121.

⁵ See Appendix, note 534.

⁶ See Appendix, note 533.

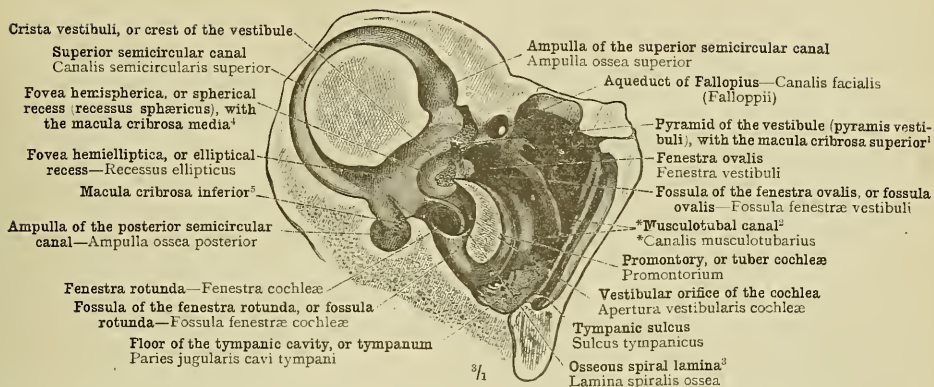
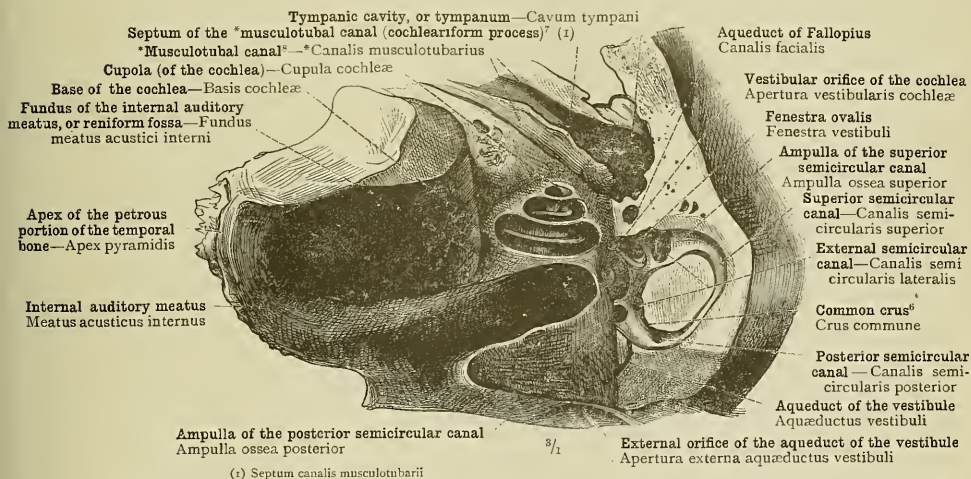


FIG. 1449.—THE ANTERIOR PORTION OF THE VESTIBULE WITH THE SUPERIOR SEMICIRCULAR CANAL. IN THE VESTIBULE WE SEE THE MACULÆ CRIEROSÆ (see Appendix, notes 531, 532, and 533) AND THE VESTIBULAR ORIFICE OF THE COCHLEA.

The petrous portion of a right temporal bone was sawn across in a plane nearly perpendicular to its long axis in such a manner that the section cut the tympanum transversely and passed through the fenestra ovalis and the whole length of the superior semicircular canal. The inner segment of the petrous portion of the temporal bone is viewed from the outer side.



(1) Septum canalis musculotubarii

FIG. 1450.—THE RELATION OF THE VESTIBULE TO THE COCHLEA AND OF THIS LATTER TO THE FUNDUS OF THE INTERNAL AUDITORY MEATUS OR RENIFORM FOSSA AND TO THE *MUSCULOTUBAL CANAL (i.e., THE CANAL FOR THE TENSOR TYMPANI MUSCLE AND THE OSSEOUS CANAL FOR THE EUSTACHIAN TUBE—see Appendix, note 539), *CANALIS MUSCULOTUBARIUS, DISPLAYED FROM ABOVE IN A RIGHT TEMPORAL BONE.

The superior semicircular canal is opened throughout its whole length, and a portion of the aqueduct of the vestibule, aquæductus vestibuli, is also exposed.

¹ See Appendix, note 531.
 5 See Appendix, note 533.

² See Appendix, note 532.
 6 See Appendix, note 539.

3 See note 3 to p. 932.
 7 See Appendix, notes 574 and 582.

4 See Appendix, note 532.
 8 See Appendix, note 539.

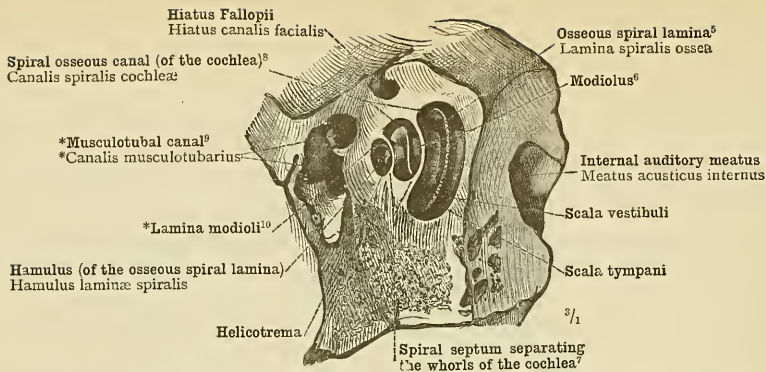


FIG. 1451.—THE (OSSEOUS) COCHLEA, DIVIDED IN A PLANE PARALLEL TO ITS LONG AXIS. ITS RELATION TO THE *MUSCULOTUBAL CANAL (*i.e.*, THE CANAL FOR THE TENSOR TYMPANI MUSCLE AND THE OSSEOUS CANAL FOR THE EUSTACHIAN TUBE—see Appendix, note 628), *CANALIS MUSCULOTUBARIUS. INNER SURFACE OF THE OUTER SEGMENT.

Displayed by a saw-cut in a plane perpendicular to the long axis of the petrous portion of the right temporal bone.

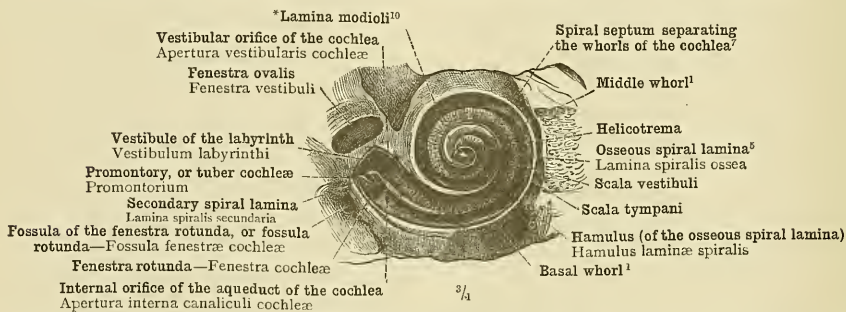


FIG. 1452.—THE (OSSEOUS) COCHLEA OF THE RIGHT EAR, DISPLAYED FROM BEFORE BY THE REMOVAL OF THE CAROTID CANAL, CANALIS CAROTICUS, AND OF THE *MUSCULOTUBAL CANAL (*i.e.*, THE CANAL FOR THE TENSOR TYMPANI MUSCLE AND THE OSSEOUS CANAL FOR THE EUSTACHIAN TUBE—see Appendix, note 628), *CANALIS MUSCULOTUBARIUS. THE WHORLS OF THE COCHLEA (*see* Appendix, note 530), OPENED BY THE REMOVAL OF THE OUTER WALL OF THAT ORGAN, ARE VIEWED FROM THE DIRECTION OF THE APEX OF THE COCHLEA—THAT IS, FROM ABOVE AND THE OUTER SIDE.

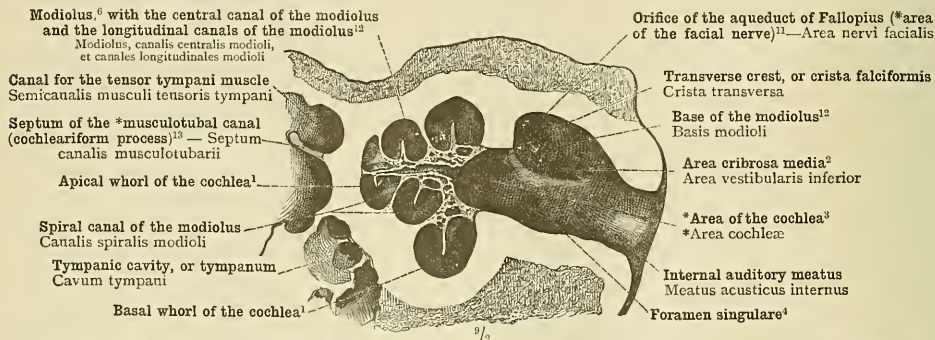


FIG. 1453.—AXIAL SECTION THROUGH THE (OSSEOUS) COCHLEA OF THE RIGHT EAR. THE MODIOLUS⁶ IS DIVIDED THROUGHOUT ITS WHOLE LENGTH.

¹ See Appendix, note 530.

² See note 3 to p. 932.

³ See Appendix, note 538.

⁴ See Appendix, note 538.

⁵ See Appendix, note 530.

⁶ The modiolus, the central pillar or axis of the cochlea, is also known as the *columnella cochleae*.

⁷ See Appendix, note 538.

⁸ See Appendix, note 538.

⁹ See Appendix, note 534.

¹⁰ See Appendix, note 530.

¹¹ See Appendix, note 538.

¹² See Appendix, note 530.

¹³ See Appendix, note 533.

¹⁴ See Appendix, note 533.

¹⁵ See Appendix, note 537.

¹⁶ See Appendix, note 537.

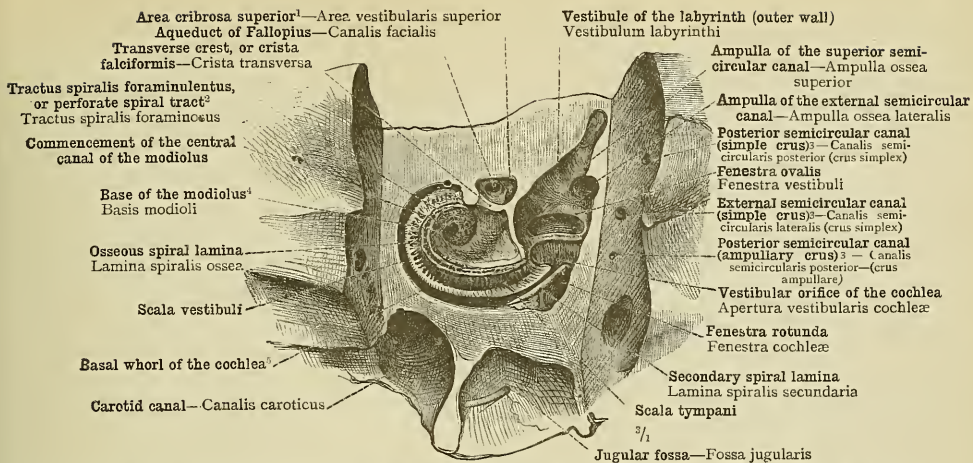


FIG. 1454.—THE BASAL WHORL OF THE COCHLEA (see Appendix, note 530) WITH THE BASE OF THE MODIOLUS, BASIS MODIOLI (see Appendix, note 530), SEEN FROM BEHIND. THE OSSEOUS SPIRAL LAMINA, LAMINA SPIRALIS OSSEA, BY MEANS OF WHICH THE SCALA VESTIBULI IS [IN PART] SEPARATED FROM THE SCALA TYMPANI, IS SEEN FROM THE BASAL SIDE OF THE COCHLEA [THAT IS, FROM BELOW, ACCORDING TO THE CONVENTIONAL DESCRIPTION OF THE COCHLEA—see Appendix, note 540]. THE OPENING OF THE SCALA VESTIBULI INTO THE VESTIBULE (VESTIBULAR ORIFICE OF THE COCHLEA, APERTURA VESTIBULARIS COCHLEAE), AND THE OPENING OF THE SCALA TYMPANI INTO THE TYMPANUM OR TYMPANIC CAVITY BY MEANS OF THE FENESTRA ROTUNDA (CLOSED IN THE RECENT STATE BY THE SECONDARY TYMPANIC MEMBRANE OR MEMBRANE OF THE FENESTRA ROTUNDA—see Appendix, note 528). DISPLAYED FROM BEHIND IN THE PETROUS PORTION OF THE RIGHT TEMPORAL BONE.

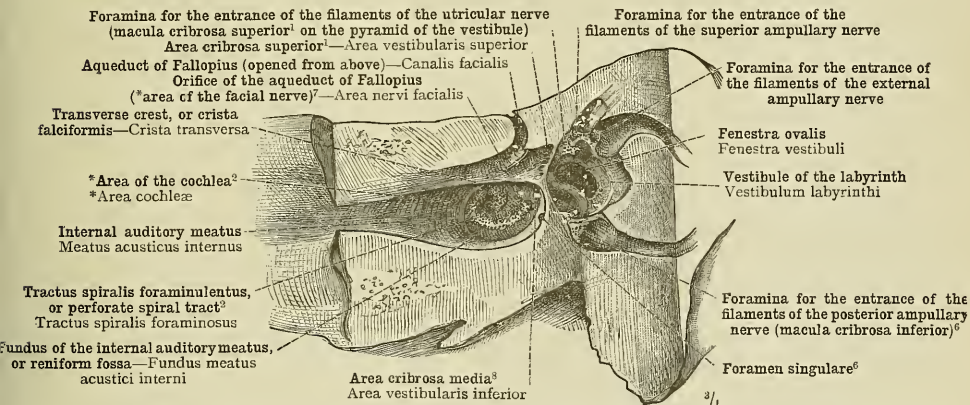


FIG. 1455.—THE INTERNAL AUDITORY MEATUS, MEATUS ACUSTICUS INTERNUS, OPENED FROM BEHIND IN THE PETROUS PORTION OF THE RIGHT TEMPORAL BONE. IN THE FUNDUS OF THE INTERNAL AUDITORY MEATUS, OR RENIFORM FOSSA, WE SEE THE TRACTUS SPIRALIS FORAMINULENTUS, OR PERFORATE SPIRAL TRACT (TRACTUS SPIRALIS FORAMINOSUS, ACCORDING TO TOLDT⁴), AND THE ORIFICES OF THE NERVE CANALICULI LEADING INTO THE MODIOLUS AND THE OSSEOUS SPIRAL LAMINA, AND ALSO THE ORIFICES OF THE NERVE CANALICULI LEADING TO THE MACULAE CRIBOSEAE OF THE VESTIBULE AND TO THE AMPULLAE OF THE SEMICIRCULAR CANALS (see Appendix, notes 531, 532, 533, and 537). IN THE VESTIBULE, LIKEWISE OPENED FROM BEHIND, WE SEE THE MACULAE CRIBOSEAE, SUPERIOR ET INFERIOR, AND THE FORAMINA FOR THE ENTRANCE OF THE FILAMENTS OF THE SUPERIOR AND EXTERNAL AMPULLARY NERVES.

¹ See Appendix, note 531.

² See Appendix, note 534.

³ See Appendix, note 539.

⁴ See Appendix, note 539.

⁵ See Appendix, note 539.

⁶ See Appendix, note 533.

⁷ See Appendix, note 539.

⁸ See Appendix, note 532.

⁹ See Appendix, note 544.

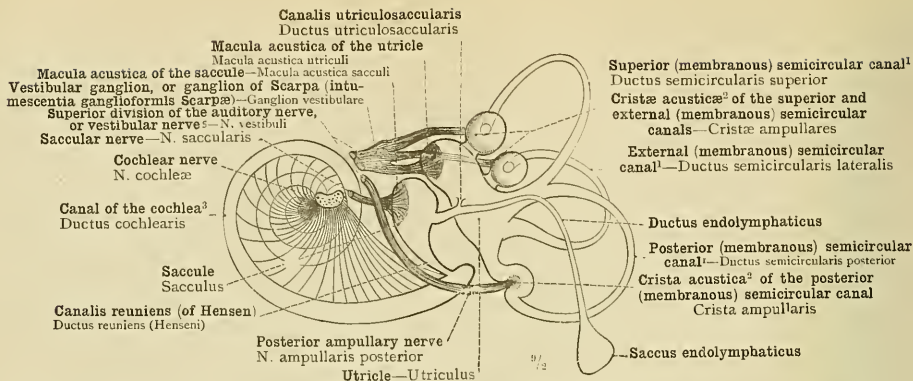


FIG. 1456.—DIAGRAMMATIC REPRESENTATION OF THE RIGHT MEMBRANOUS LABYRINTH AND THE DISTRIBUTION OF THE RIGHT AUDITORY NERVE, NERVUS ACUSTICUS. SEEN FROM BEHIND.

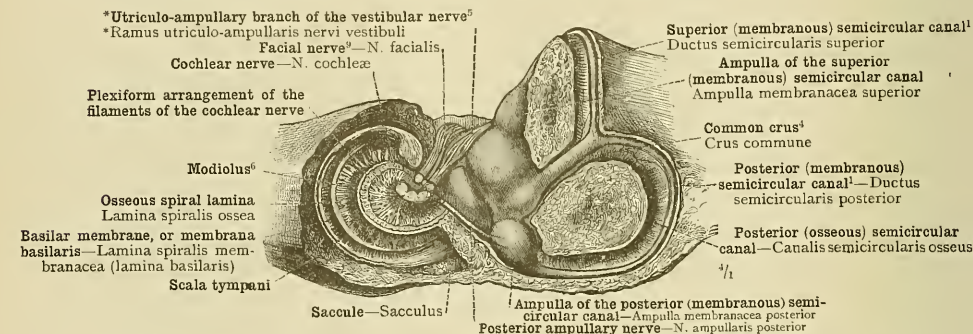


FIG. 1457.—THE MEMBRANOUS LABYRINTH OF A NEW-BORN INFANT, DISPLAYED BY THE PARTIAL REMOVAL OF THE OSSEOUS LABYRINTH. RIGHT EAR. SEEN FROM BEHIND.

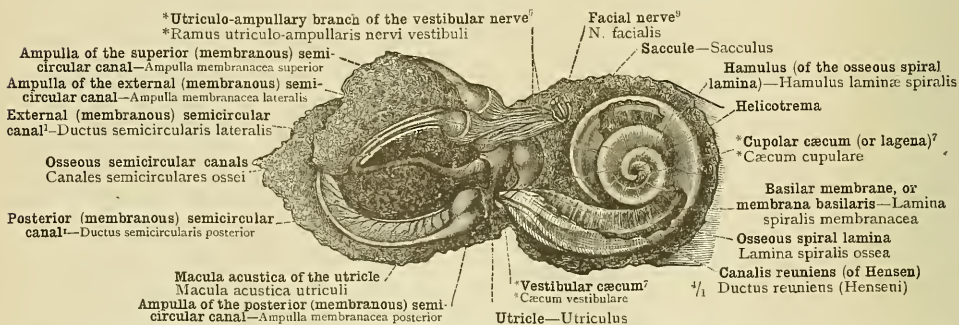


FIG. 1458.—THE MEMBRANOUS LABYRINTH OF A NEW-BORN INFANT, SEEN FROM BEFORE. RIGHT EAR. THE WALL OF THE CAVITY OF THE COCHLEA (see Appendix, note ⁵⁴⁶) IS FORMED BY THE PERIOSTEAL INVESTMENT OF THE SPIRAL OSSEOUS CANAL OF THE COCHLEA (see Appendix, note ⁵⁴⁶) AND BY THE SPIRAL LIGAMENT, LIGAMENTUM SPIRALE.

¹ See Appendix, note 542.

² See Appendix, note 543.

³ Or, more briefly, the *cochlear canal*. Also known in England by the Latin names *canalis (membranaceus) cochleæ* and *ductus cochlearis*. It was formerly known as the *scala media*. See also Appendix, note 537.

⁴ See Appendix, note 550.

⁵ See Appendix, note 554.

⁶ See note ⁵ to p. 934.

⁷ See Appendix, note 545.

⁸ See Appendix, note 546.

⁹ See note ¹¹ to p. 937.

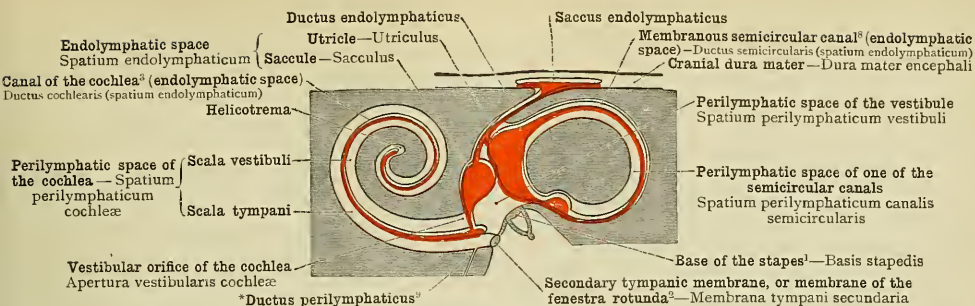


FIG. 1459.—DIAGRAM OF THE ENDOLYMPHATIC AND PERILYMPHATIC SPACES OF THE LABYRINTH (THE FORMER RED, THE LATTER WHITE).

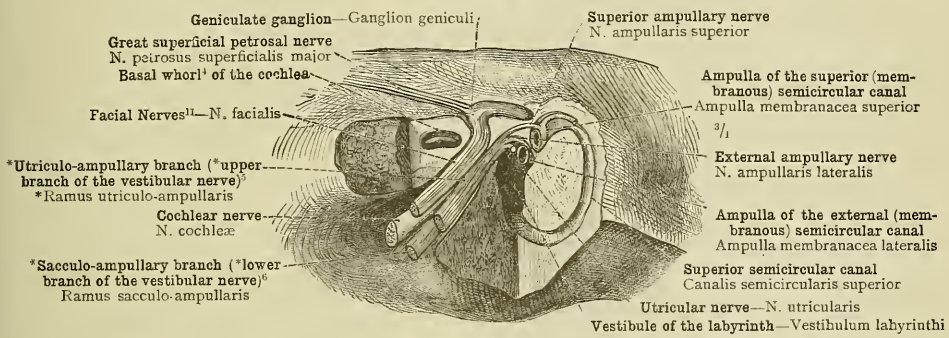


FIG. 1460.—THE FACIAL NERVE AND THE *UPPER OR *UTRICULO-AMPELLARY BRANCH, *RAMUS UTRICULO-AMPELLARIS, OF THE *VESTIBULAR NERVE, *NERVUS VESTIBULARIS,⁴ DISPLAYED FROM ABOVE BY THE OPENING OF THE INTERNAL AUDITORY MEATUS.

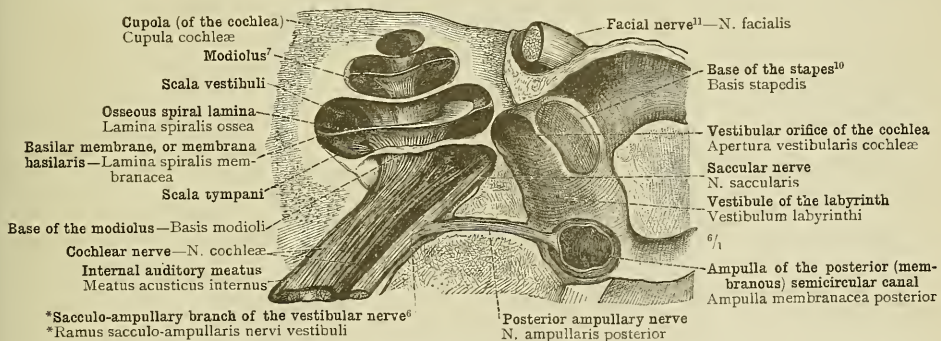


FIG. 1461.—THE COCHLEAR NERVE AND THE *LOWER OR *SACCULO-AMPELLARY BRANCH, RAMUS *SACCULO-AMPELLARIS,⁶ OF THE *VESTIBULAR NERVE, *NERVUS VESTIBULARIS, DISPLAYED IN THE PREPARATION ALREADY DEPICTED IN FIG. 1460 BY THE REMOVAL OF THE FACIAL NERVE AND THE *UPPER BRANCH OF THE *VESTIBULAR NERVE.⁵

¹ Known also as the basal plate or foot-plate of the stapes.

² See Appendix, note 523.

³ Or, more briefly, the cochlear canal. Also known in England by the Latin names *canalis (membranaceus) cochleæ* and *ductus cochlearis*. It was formerly known as the *scala media*. See Appendix, note 523.

⁴ See Appendix, note 523.

⁵ This *utriculo-ampullary branch, or so-called *upper branch of the vestibular nerve, is itself the entire vestibular nerve in Quain's terminology. See Appendix, note 544.

⁶ This *sacculo-ampullary branch represents the posterior branch of the inferior division of the auditory nerve in Quain's terminology. See Appendix, note 544.

⁷ Also known as the *columnella cochleæ*.

⁸ See Appendix, note 542.

⁹ See Appendix, note 542.

¹⁰ Also known as the foot-plate, or basal plate, of the stapes.

¹¹ In Soemmerring's enumeration the *facialis* is the seventh, the auditory the eighth cranial nerve; in that of Willis the former is the *portio dura*, the latter the *portio mollis*, of the seventh cranial nerve.

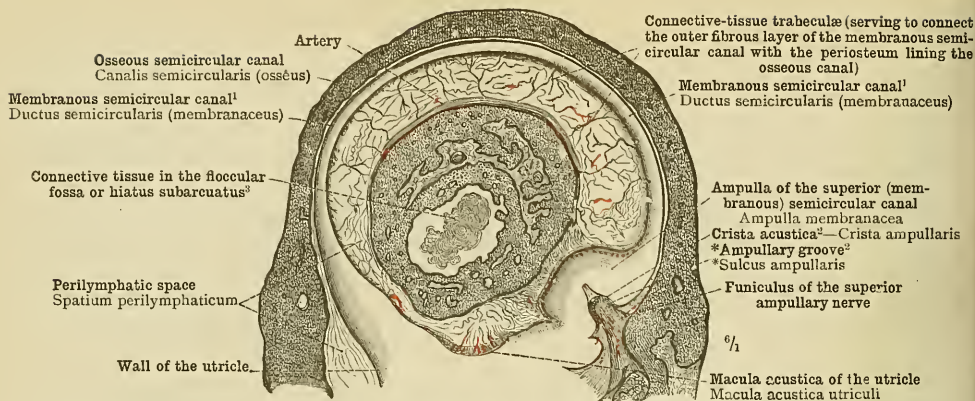


FIG. 1462.—LONGITUDINAL SECTION THROUGH THE SUPERIOR (OSSEOUS AND MEMBRANOUS) SEMICIRCULAR CANAL; THE CRISTA ACUSTICA, CRISTA AMPULLARIS (see Appendix, note 643), WITH THE NERVE TERMINAL, IS SEEN IN TRANSVERSE SECTION.

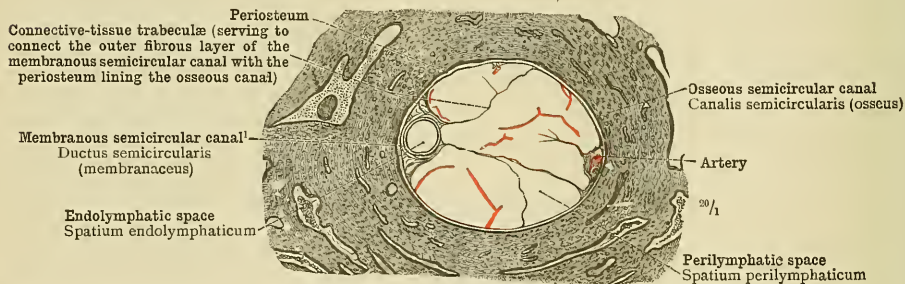


FIG. 1463.—TRANSVERSE SECTION THROUGH THE SIMPLE CRUS OF THE SUPERIOR (OSSEOUS AND MEMBRANOUS) SEMICIRCULAR CANAL.

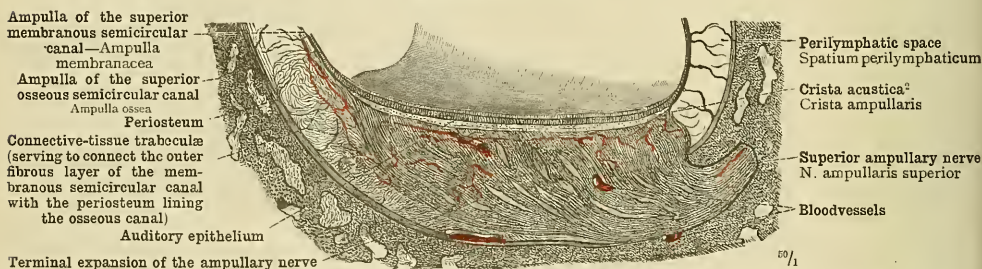


FIG. 1464.—SECTION THROUGH THE AMPULLA OF THE SUPERIOR SEMICIRCULAR CANAL ALONG THE CRISTA ACUSTICA (see Appendix, note 643); THE NERVE TERMINAL AND THE NERVE FILAMENT PASSING TO THE CREST ARE DIVIDED LONGITUDINALLY.

ALL THREE SPECIMENS FIGURED ON THIS PAGE WERE PREPARED FROM THE DECALCIFIED PETROUS BONE OF A NEW-BORN INFANT.

¹ See Appendix, note 542.

² See Appendix, note 543.

³ By Toldt called *fossa subarcuata*—see Fig. 129, p. 63, and Fig. 144, p. 70, in Part I. It receives its name because, in the infantile state of the bone (here figured), the fossa passes beneath the arch of the superior semicircular canal. In the adult this deep pit is replaced by a small foramen occupied by a strand of connective tissue.

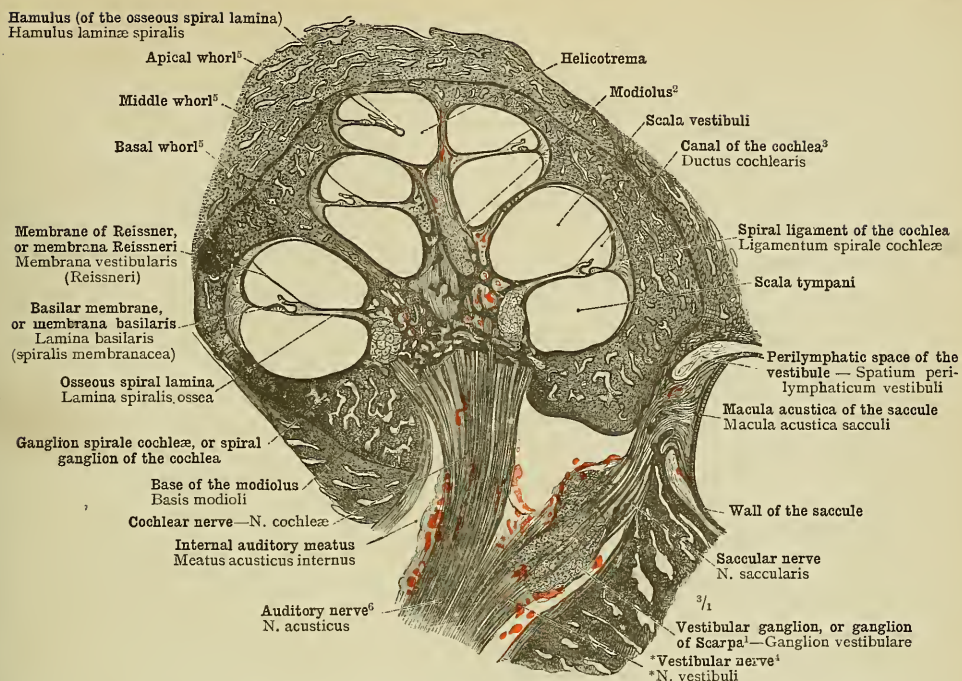


FIG. 1465.—AXIAL SECTION THROUGH THE DECALCIFIED COCHLEA OF A NEW-BORN INFANT. ENTRANCE OF THE COCHLEAR NERVE. ON THE RIGHT SIDE OF THE PREPARATION WE SEE THE MACULA ACUSTICA OF THE SACCULE, THE NERVE TERMINAL OF THE SACCULAR NERVE, AND ALSO THE VESTIBULAR GANGLION OR GANGLION OF SCARPA, GANGLION VESTIBULARE.¹

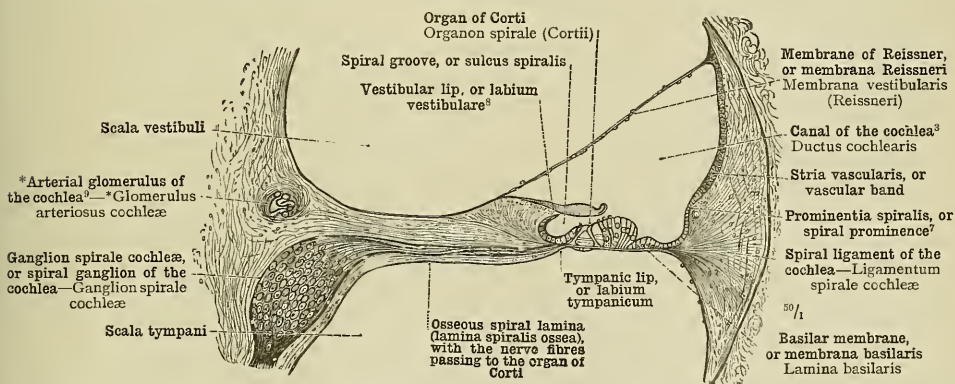


FIG. 1466.—AXIAL SECTION THROUGH ONE OF THE WHORLS OF THE COCHLEA (see Appendix, note 530). CANAL OF THE COCHLEA, DUCTUS COCHLEARIS,³ WITH THE TERMINAL APPARATUS OF THE COCHLEAR NERVE, KNOWN AS THE ORGAN OF CORTI, ORGANON SPIRALE.

¹ Or *intumescentia gangliiformis Scarpa*.

² Also known as the *columella cochleae*.

³ Or, more briefly, the *cochlear canal*. Also known in England by the Latin names: *canalis (membranaceus) cochleae* and *ductus cochlearis*. It was formerly known as the *scala media*. See also Appendix, note 53^a.

⁴ See Appendix, note 54^b.

⁵ See Appendix, note 53^c.

⁶ Eighth cranial nerve in Soemmerring's enumeration; *portio mollis* of the seventh in that of Willis.

⁷ See Appendix, note 54^d.

⁸ The *vestibular lip* of the osseous spiral lamina is also known as the *crista spiralis*, and sometimes as the *labium sulcatum* (Macalister).

⁹ See Appendix, note 55^a.

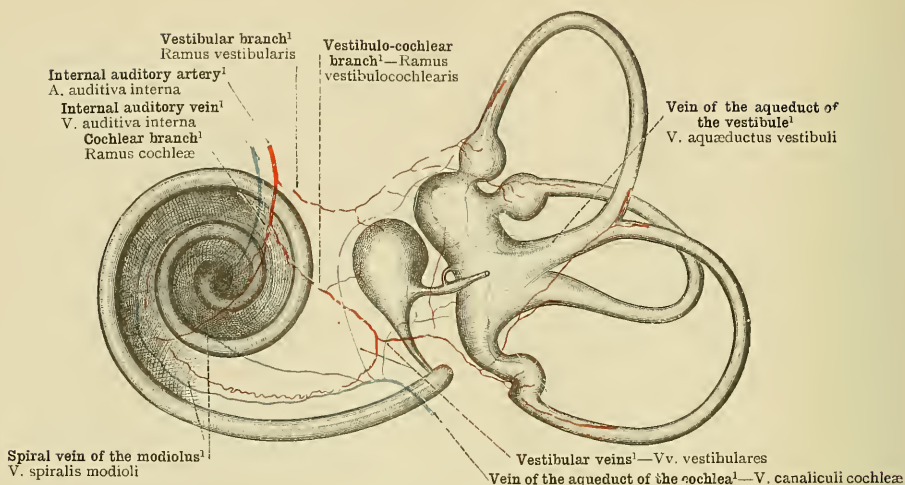


FIG. 1467.—DIAGRAMMATIC REPRESENTATION OF THE DISTRIBUTION OF THE BLOODVESSELS OF THE MEMBRANOUS LABYRINTH. (BASED ON THE RESEARCHES OF SIEBENMANN; *see Appendix, note 551.*)

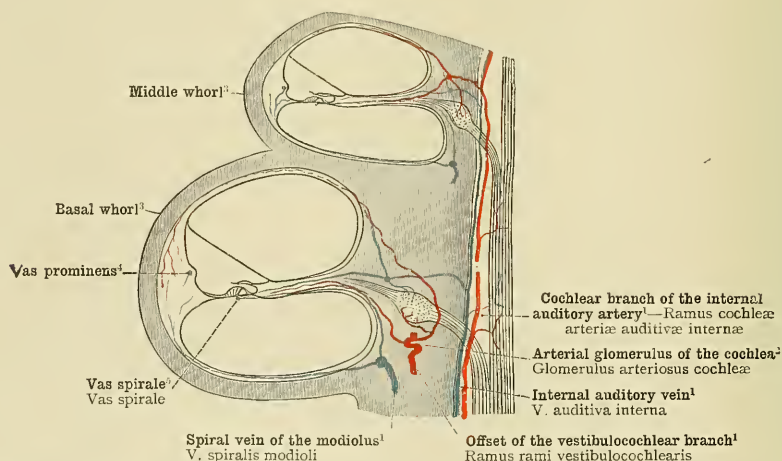


FIG. 1468.—DIAGRAMMATIC REPRESENTATION OF THE DISTRIBUTION OF THE BLOODVESSELS OF THE COCHLEA (*see Appendix, note 551.*)

¹ See Appendix, note 551.

² See Appendix, note 550.

³ See Appendix, note 550.

⁴ See Appendix, note 549.

⁵ See Appendix, note 552.

ORGANON OLFACTUS, CAVUM NASI

THE NOSE

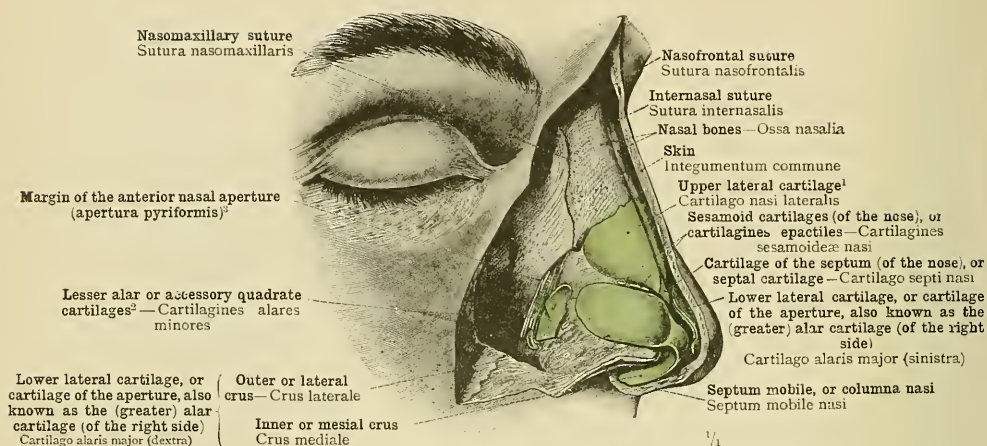


FIG. 1469.—THE CARTILAGES OF THE NOSE, DISPLAYED BY THE REMOVAL OF THE SKIN AND THE MUSCLES FROM THE RIGHT SIDE OF THE NOSE: THE LOWER LATERAL CARTILAGE OR CARTILAGE OF THE APERTURE, ALSO KNOWN AS THE (GREATER) ALAR CARTILAGE, CARTILAGO ALARIS MAJOR, AND THE LESSER ALAR OR ACCESSORY QUADRATE CARTILAGES, CARTILAGINES ALARES MINORES,² FORMING THE GROUNDWORK OF THE ALA NASI; THE UPPER LATERAL CARTILAGE, CARTILAGO NASI LATERALIS,¹ WHICH, IN CONJUNCTION WITH THE NASAL BONE, COMPLETES THE FRAMEWORK OF THE DORSUM OF THE NOSE; THE SESAMOID CARTILAGES (OF THE NOSE), OR CARTILAGINES EPACILLES, CARTILAGINES SESAMOIDEÆ NASI.

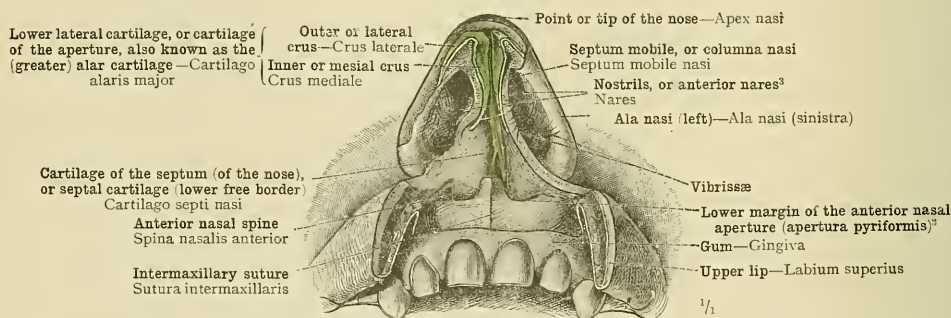


FIG. 1470.—THE NOSTRILS OR ANTERIOR NARES³: BETWEEN THEM IS THE MOVABLE PORTION OF THE SEPTUM OF THE NOSE, SEPTUM MOBILE OR COLUMNÆ NASI (ALSO KNOWN IN THE GERMAN OFFICIAL NOMENCLATURE AS "SEPTUM MEMBRANACEUM NASI"; AS GROUNDWORK OF THE NOSTRILS WE SEE ON EACH SIDE THE INNER OR MESIAL CRUS OF THE LOWER LATERAL CARTILAGE OR CARTILAGE OF THE APERTURE, CARTILAGO ALARIS MAJOR.

¹ By Macalister called the *lateral expansion of the septal cartilage*; or sometimes, the *lower lateral cartilage* of Quain being by Macalister called the *alar cartilage*, the *upper lateral cartilage* of Quain is by Macalister called simply the *lateral cartilage*.

² *Lesser Alar Cartilages*.—The name of *lesser alar cartilage* is given in contrast with the name of (*greater*) alar cartilage by which the lower lateral cartilage or cartilage of the aperture is sometimes known. Quain, however, calls them *cartilagine minores* vel *quadrate*; while the name *accessory quadrate cartilages* is used by Macalister.

³ *Anterior Nasal Aperture and Anterior Nares*.—The *anterior nasal aperture* (*apertura pyriformis*) in the official German nomenclature, and the name is often used also in England) is the anterior orifice of the nasal fossæ in the dried skull; the *anterior nares*, on the other hand, are the *nostrils*, the anterior orifices of the nasal fossæ when the soft parts are intact.

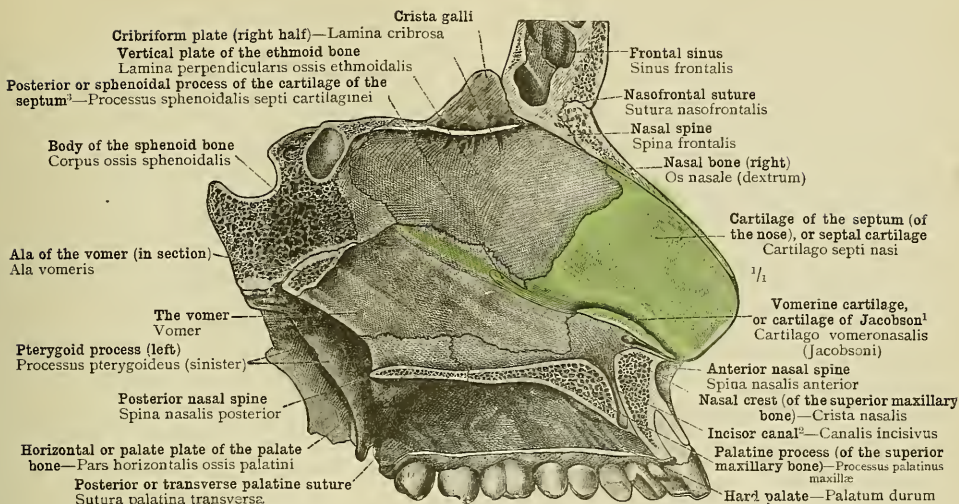


FIG. 1471.—THE OSSEOUS AND CARTILAGINOUS SEPTUM OF THE NOSE, SEPTUM OSSEUM ET SEPTUM CARTILAGINEUM NASI; ALONG THE LOWER BORDER OF THE CARTILAGE OF THE SEPTUM IS THE VOMERINE CARTILAGE OR CARTILAGE OF JACOBSON (CARTILAGO VOMERONASALIS—see Appendix, note 553). SEEN FROM THE RIGHT SIDE.

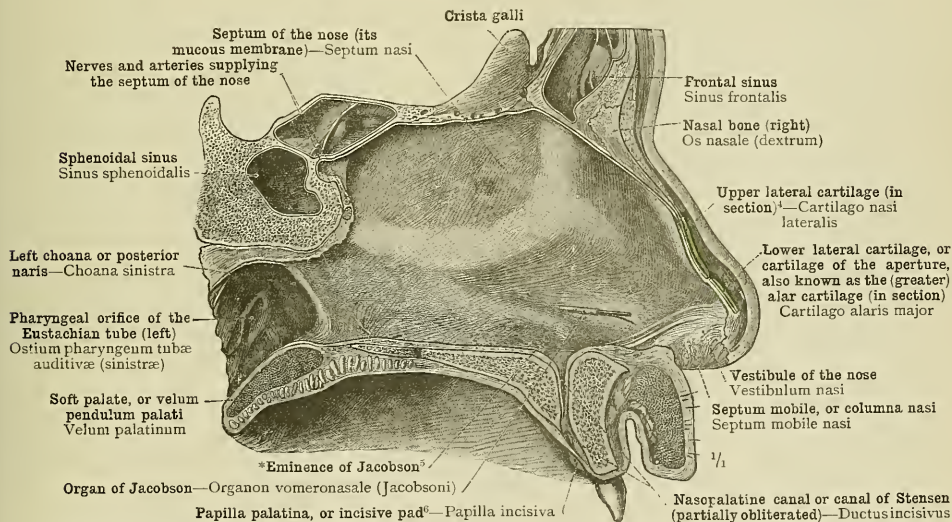


FIG. 1472.—THE NASAL SEPTUM, SEPTUM NASI, COVERED BY ITS MUCOUS MEMBRANE, SEEN FROM THE RIGHT SIDE. CORRESPONDING TO THE LOWER MARGIN OF THE CARTILAGE OF THE SEPTUM IS THE BOUNDARY BETWEEN THE VESTIBULE OF THE NOSE, VESTIBULUM NASI, AND THE NASAL FOSSÆ PROPER, CAVUM NASI. A SOUND HAS BEEN PASSED INTO THE CANAL OF THE RUDIMENTARY ORGAN OF JACOBSON.

¹ See Appendix, note 553.

² See Appendix, note 454.

³ The Latin name only of this process is mentioned by Quain—*processus posterior seu sphenoidalis*.

⁴ See note ¹ to p. 942.

⁵ See Appendix, note 554.

⁶ See note 5 to p. 416, in Part IV.

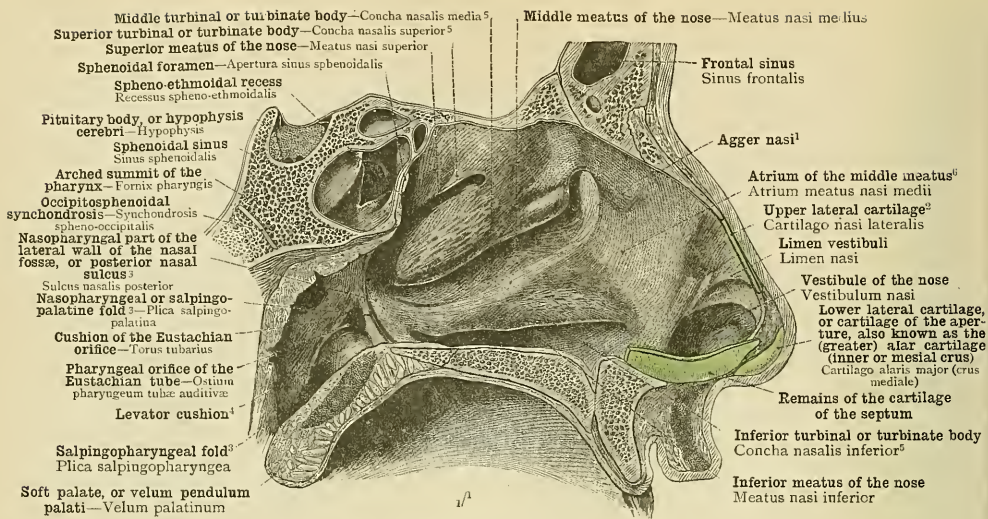


FIG. 1473.—THE LEFT LATERAL WALL OF THE NASAL FOSSÆ WITH THE TURBINATE BONES AND THE NASAL MEATUS. THE VESTIBULE OF THE NOSE, VESTIBULUM NASI, IS MARKED OFF FROM THE NASAL FOSSÆ PROPER BY THE LIMEN VESTIBULI, LIMEN NASI, WHICH CORRESPONDS TO THE LOWER MARGIN OF THE UPPER LATERAL CARTILAGE.

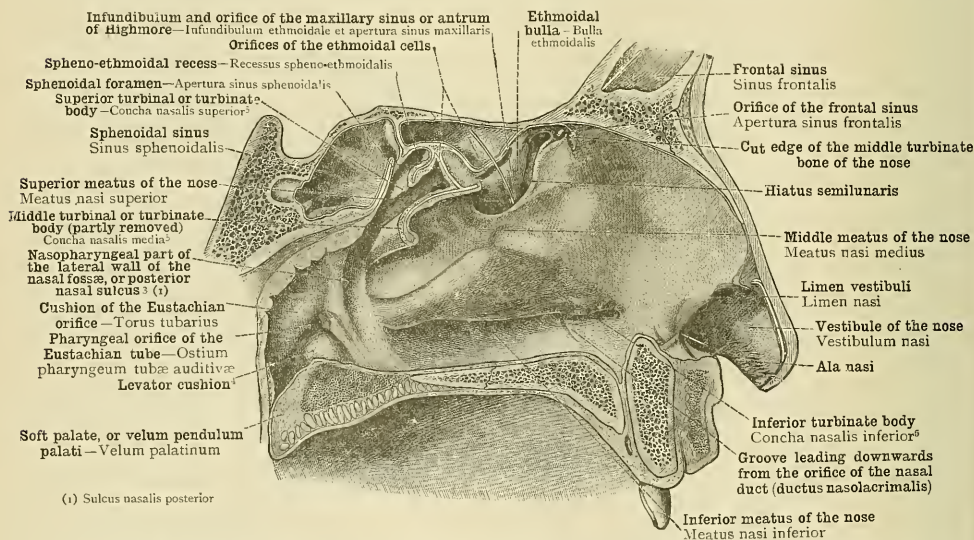


FIG. 1474.—THE LEFT LATERAL WALL OF THE NASAL FOSSÆ, THE GREATER PART OF THE MIDDLE TURBINAL AND THE ANTERIOR PORTION OF THE SUPERIOR TURBINAL HAVING BEEN REMOVED. THE ORIFICES OF THE ACCESSORY CAVITIES OF THE NOSE, SINUS PARANASALES: OF THE SPHENOIDAL SINUS, SINUS SPHENOIDALIS, THE FRONTAL SINUS, SINUS FRONTALIS, AND THE MAXILLARY SINUS OR ANTRUM OF HIGHMORE, SINUS MAXILLARIS. THE TWO LAST-NAMED ORIFICES ARE DISTINGUISHED BY SOUNDS WHICH HAVE BEEN PASSED THROUGH THEM.

¹ *Agger Nasi*.—This ridge, which is visible also in the dried bone (see Fig. 160, p. 78, and Figs. 203 and 204, p. 90, Part I.), is a rudiment of the nasoturbinal met with in most mammals.

² See note 1 to p. 92.

³ See Appendix to Part IV., note 4.

⁴ See note 4 to p. 436, in Part IV.

⁵ *Conchæ Nasales*.—In Toldt's nomenclature the same term, *concha nasalis*, is used to denote the turbinate bone and the turbinate or turbinate body—i.e., the turbinate bone covered by mucous membrane.

⁶ By Macalister called the *region of the atrium*.

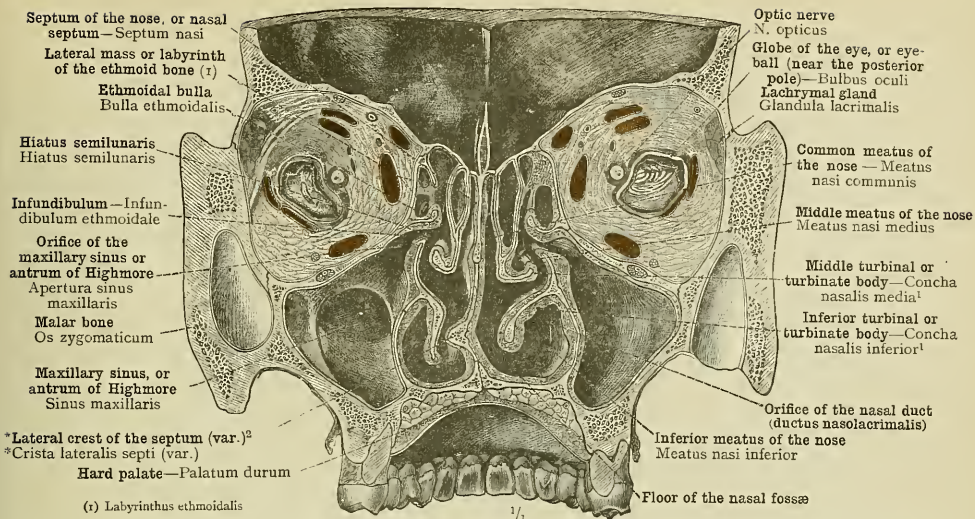


FIG. 1475.—CORONAL SECTION PASSING NEARLY THROUGH THE MIDDLE OF THE NASAL FOSSÆ. THE ANTERIOR SEGMENT VIEWED FROM BEHIND. ORIFICES OF THE MAXILLARY SINUSES OR ANTRA OF HIGHMORE. THE ORBITS ARE DIVIDED IN A PLANE IMMEDIATELY BEHIND THE ENTRANCE OF THE OPTIC NERVE INTO THE EYEBALL.

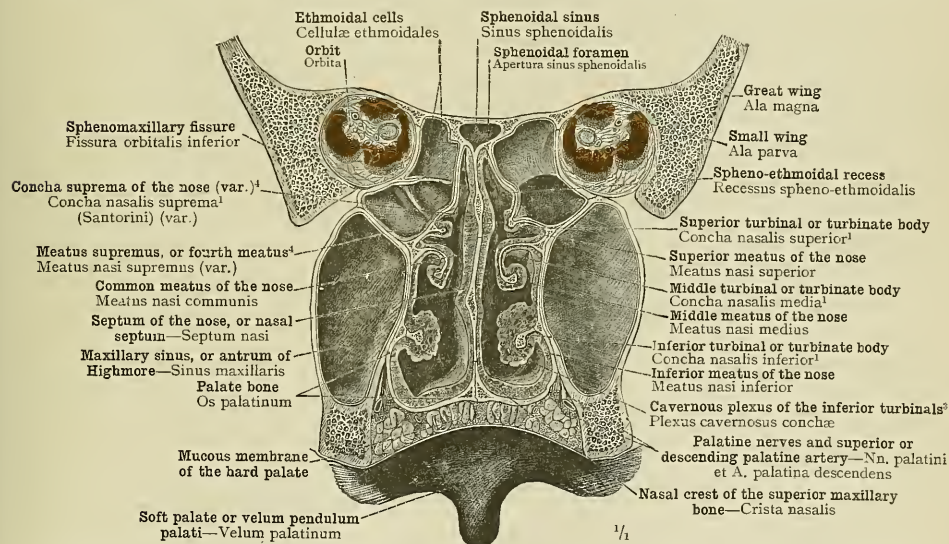


FIG. 1476.—CORONAL SECTION THROUGH THE POSTERIOR PART OF THE NASAL FOSSÆ AND THE MAXILLARY SINUSES OR ANTRA OF HIGHMORE. THE POSTERIOR SEGMENT VIEWED FROM BEFORE. SPHENOIDAL FORAMINA.

¹ See note 5 to p. 944.

² See Appendix, note 555.

See Appendix, note 556.

⁴ See Appendix, note 557.

Cavum nasi—The nasal fossæ.

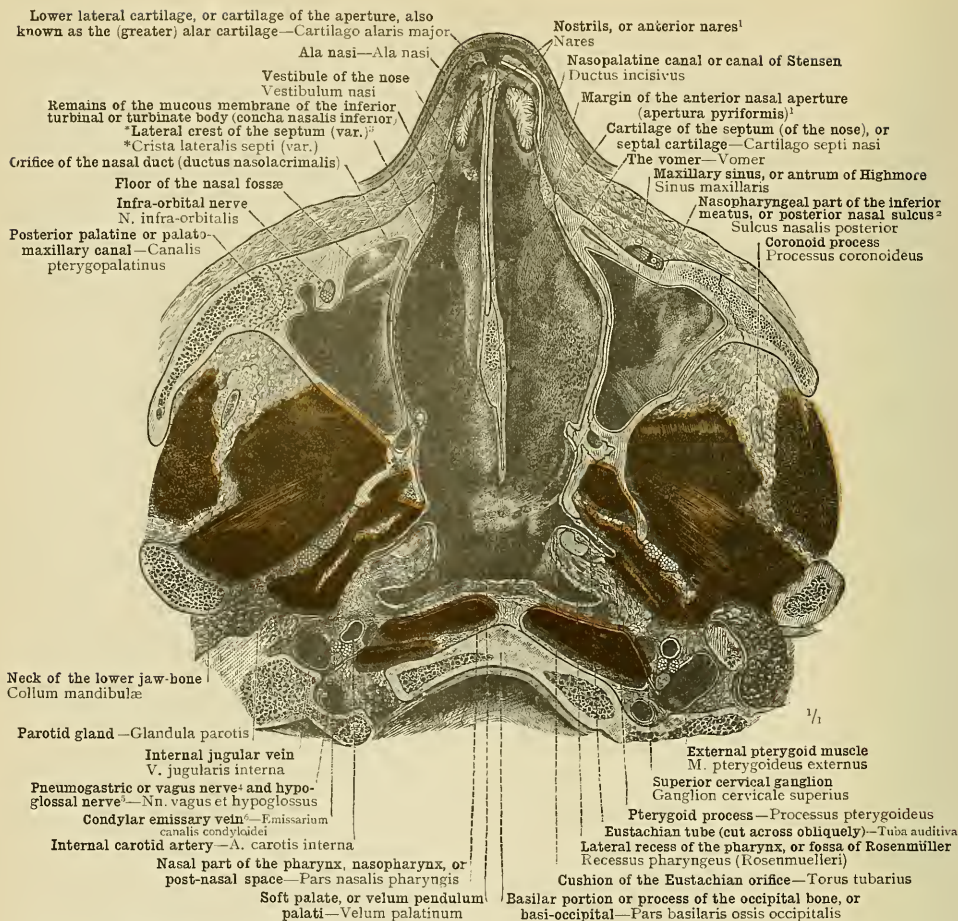


FIG. 1477.—HORIZONTAL SECTION THROUGH THE LOWER PART OF THE NASAL FOSSE AND THE MAXILLARY SINUSES, OR ANTRA OF HIGHMORE, AND THROUGH THE NASAL PART OF THE PHARYNX, NASOPHARYNX, OR POST-NASAL SPACE. THE LOWER SEGMENT VIEWED FROM ABOVE. THE SECTION PASSES THROUGH THE NECK OF THE LOWER JAW-BONE, AND THROUGH THE BASILAR PORTION OR PROCESS OF THE OCCIPITAL BONE, OR BASI-OCCIPITAL, IMMEDIATELY ABOVE THE FORAMEN MAGNUM. IN THE REGION OF THE NASAL FOSSE THE PLANE OF SECTION PASSES THROUGH THE ANTERIOR AND POSTERIOR EXTREMITIES OF THE INFERIOR TURBINAL OR TURBinate BODY; THE LOWER SEGMENT OF THE LATTER HAS BEEN REMOVED, SO THAT THE FLOOR OF THE NASAL FOSSE IS EXPOSED THROUGHOUT ITS WHOLE EXTENT AS WELL AS THE LOWER PART OF THE OUTER WALL. ON THE LEFT SIDE OF THE SEPTUM OF THE NOSE A *LATERAL CREST, **CRISTA LATERALIS SEPTI* (VARIETY—see *Appendix*, note ⁵⁵⁵), IS MET WITH. IN THE NASOPHARYNX THE SECTION TRAVERSES ON EACH SIDE THE PHARYNGEAL ORIFICE OF THE EUSTACHIAN TUBE, THE CUSHION OF THE EUSTACHIAN ORIFICE (*TORUS TUBARIUS*), AND THE LATERAL RECESS OF THE PHARYNX, OR FOSSA OF ROSENMÜLLER.

¹ See note 3 to p. 942.

² See *Appendix* to Part IV., note 4.

³ See *Appendix*, note 555.

⁴ *Tenth cranial nerve* in Soemmerring's enumeration; *second trunk of the eighth cranial nerve* in that of Willis.

⁵ *Twelfth cranial nerve* in Soemmerring's enumeration, *ninth* in that of Willis; also known as the *lingual motor nerve*.

⁶ See *Appendix* to Part V., note 264.

Cavum nasi—The nasal fossæ.

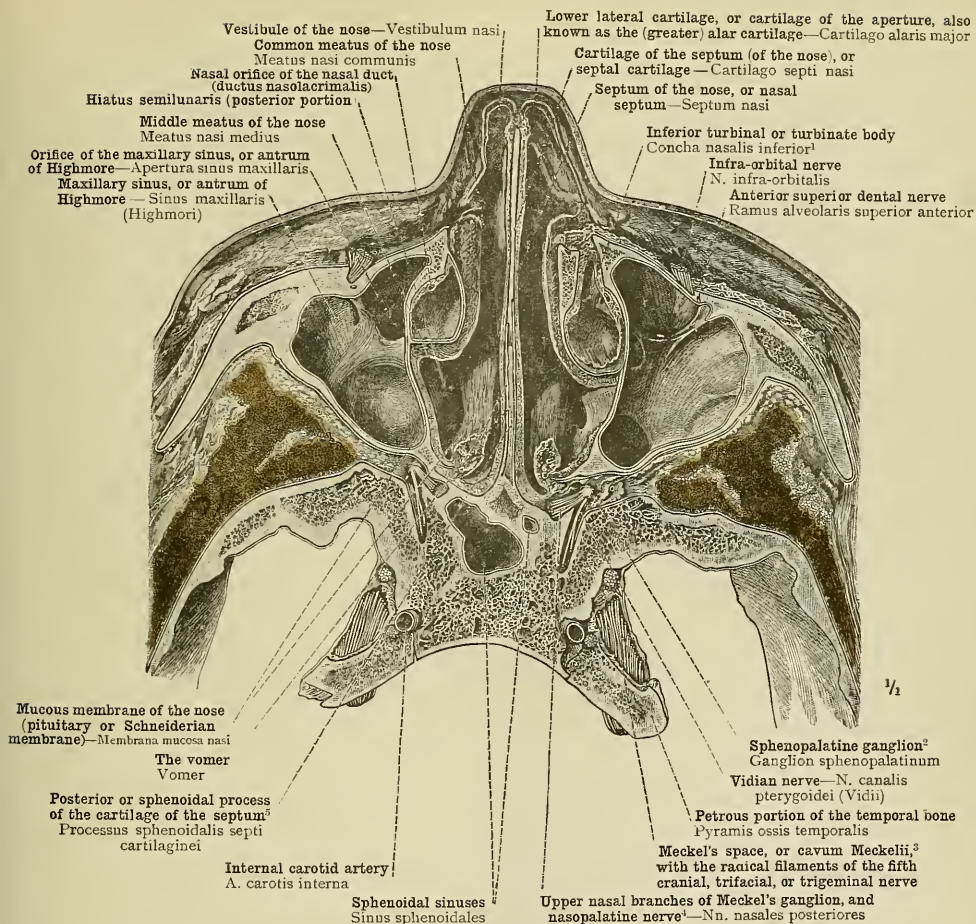


FIG. 1478.—OBLIQUE SECTION THROUGH THE NASAL FOSSÆ, DESCENDING AS IT PASSES FORWARDS, IN A PLANE ALMOST PARALLEL WITH THAT OF THE INFERIOR WALLS OF THE ORBITS. THE UPPER SEGMENT VIEWED FROM BELOW. BEHIND, THE SECTION SHOWS THE MIDDLE MEATUS; IN FRONT, THE INFERIOR MEATUS AND THE VESTIBULE OF THE NOSE. OF THE ACCESSORY CAVITIES OF THE NOSE, THE MAXILLARY SINUSES OR ANTRA OF HIGHMORE ARE CUT ACROSS IN THEIR GREATEST WIDTH, SO THAT THEIR ROOFS ARE FULLY DISPLAYED; WHILE THE SPHENOIDAL SINUSES ARE OPENED CLOSE TO THEIR LOWER EXTREMITIES. IN THE REGION OF THE SPHENOMAXILLARY FOSSA, THE UPPER PART OF WHICH TOGETHER WITH THE SPHENOPALATINE FORAMEN, FORAMEN SPHENOPALATINUM, AND THE ANTERIOR HALF OF THE VIDIAN OR PTERYGOID CANAL, CANALIS PTERYGOIDEUS (VIDII), APPEARS IN THE PLANE OF SECTION, THE SPHENOPALATINE GANGLION, GANGLION SPHENOPALATINUM,² THE VIDIAN NERVE, NERVUS CANALIS PTERYGOIDEI, AND THE PROXIMAL PORTIONS OF THE UPPER NASAL BRANCHES OF THE SPHENOPALATINE GANGLION AND THE NASOPALATINE NERVE, NN. NASALES POSTERIORES (see Appendix, note ⁴⁵⁰), ARE VISIBLE.

¹ See note 5 to p. 944.

³ See Appendix, note 538.

² Known also as *Meckel's ganglion* and as the *nasal ganglion*.

⁴ See Appendix, note 459.

⁵ See note 3 to p. 943.

Cavum nasi—The nasal fossæ.

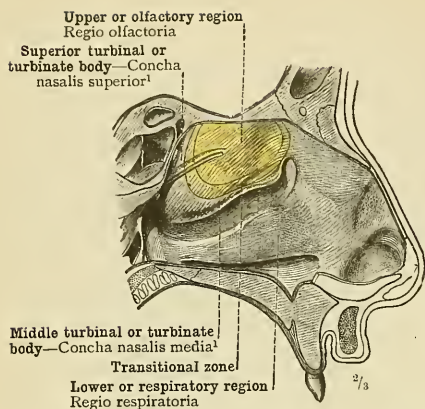


FIG. 1479.—LATERAL WALL OF THE
LEFT NASAL FOSSA.

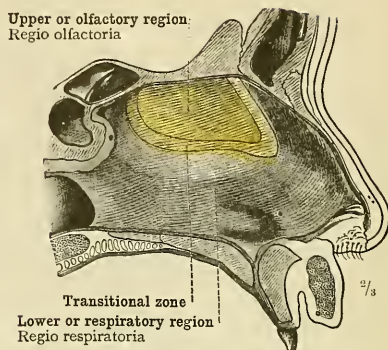


FIG. 1480.—MESIAL WALL OF THE
RIGHT NASAL FOSSA.

THE DELIMITATION OF THE UPPER OR OLFACTORY AND THE LOWER OR RESPIRATORY REGIONS OF THE NOSE, WITH THE TRANSITIONAL ZONE, WHICH VARIES GREATLY IN DIFFERENT INDIVIDUALS. WITH REGARD TO THE RADIATION OF THE OLFACTORY NERVES, COMPARE FIGS. 1302 AND 1303.

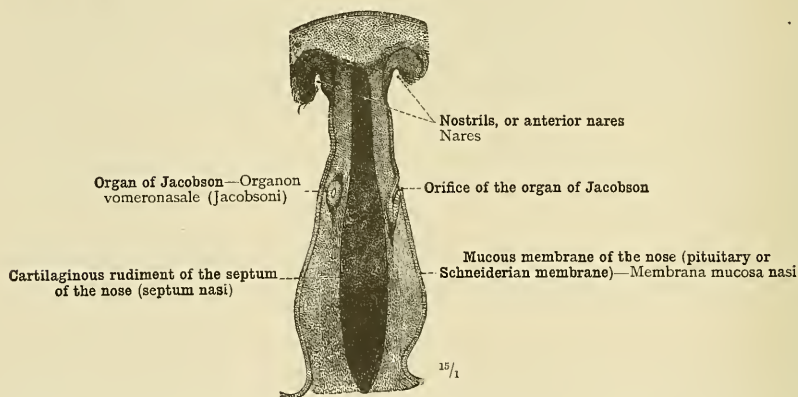


FIG. 1481.—THE ORGAN OF JACOBSON, ORGANON VOMERONASALE, OF A HUMAN FŒTUS IN THE FOURTH MONTH (MONTHS OF FOUR WEEKS EACH), HAVING A BODY-LENGTH OF 8·8 CENTIMETRES (3·465 INCHES), AS SEEN IN A HORIZONTAL SECTION THROUGH THE LOWER PORTION OF THE NASAL SEPTUM. ON THE LEFT SIDE THE CANAL IS DIVIDED OBLIQUELY; ON THE RIGHT SIDE ITS ORIFICE APPEARS IN THE PLANE OF SECTION.

¹ See note 5 to p. 944.

Cavum nasi—The nasal fossæ.

ORGANON TACTUS,
INTEGUMENTUM COMMUNE

THE ORGAN OF TOUCH,
THE SKIN

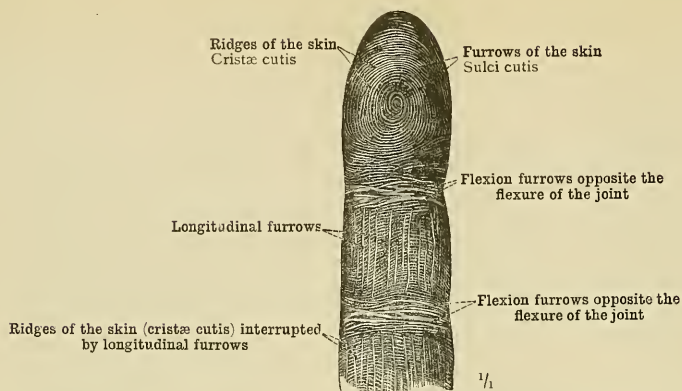


FIG. 1482.—THE FURROWS AND RIDGES OF THE SURFACE OF THE SKIN, REPRODUCED FROM AN IMPRESSION OF THE PALMAR SURFACE OF THE MIDDLE FINGER.

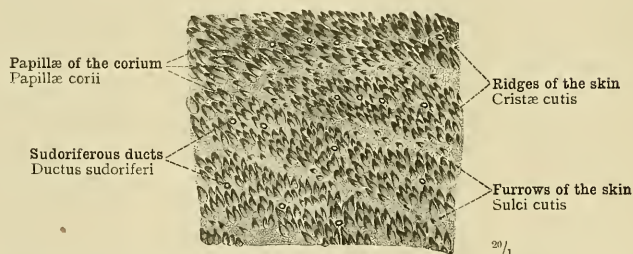


FIG. 1483.—THE FURROWS AND RIDGES OF THE TRUE SKIN, CUTIS VERA, OR CORIUM, ON THE PALMAR SURFACE OF ONE OF THE FINGERS, THE EPIDERMIS HAVING BEEN REMOVED. DRAWN WITH THE AID OF THE STEREO-SCOPIC MICROSCOPE. ARRANGEMENT OF THE PAPILLÆ AND OF THE EFFERENT DUCTS OF THE SUDORIFEROUS GLANDS OR SWEAT GLANDS.

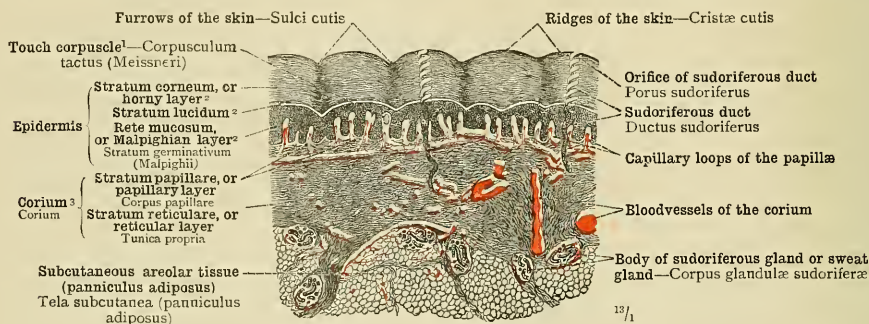


FIG. 1484.—VERTICAL SECTION THROUGH THE SKIN, CUTIS, OF THE FINGER-TIP. THE LAYERS OF THE EPIDERMIS² AND OF THE CORIUM.³ THE SUBCUTANEOUS AREOLAR TISSUE, TELA SUBCUTANEA. THE SUDORIFEROUS OR SWEAT GLANDS.

The bloodvessels have been injected with red-coloured gelatine.

¹ See Appendix, note 384.

² See Appendix, note 559.

³ The *corium* is also known as the *derma*, *cutis vera*, or *true skin*.

Cutis—The skin.

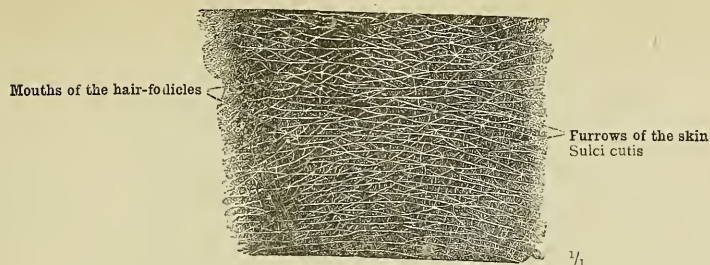


FIG. 1485.—THE FURROWS OF THE SKIN AND THE AREAS WHICH THESE FURROWS DELIMIT, REPRODUCED FROM AN IMPRESSION OF THE DORSAL SURFACE OF THE WRIST.

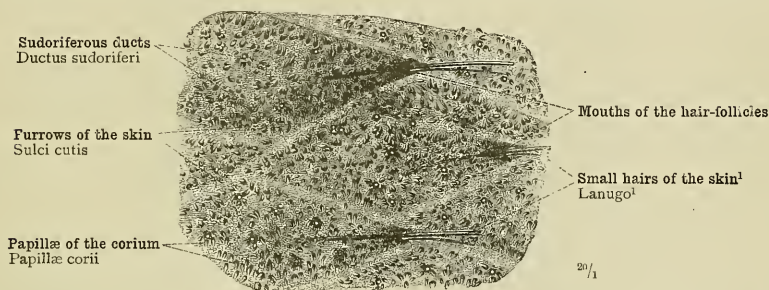


FIG. 1486.—THE FURROWS OF THE SKIN AND THE AREAS WHICH THESE FURROWS DELIMIT ON THE DORSAL SURFACE OF THE WRIST, AS DISPLAYED ON THE CORIUM WHEN THE EPIDERMIS HAS BEEN REMOVED. DRAWN WITH THE AID OF THE STEREOSCOPIC MICROSCOPE. THE ARRANGEMENT OF THE PAPILLÆ AND OF THE EFFERENT DUCTS OF THE SUDORIFEROUS GLANDS OR SWEAT GLANDS.

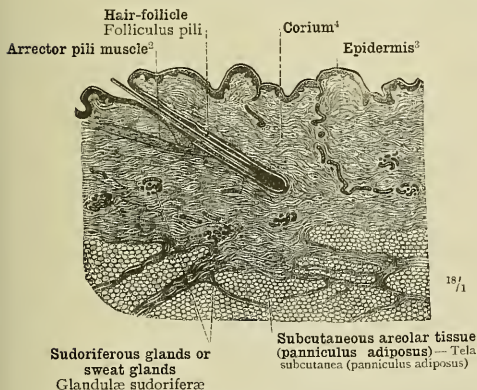


FIG. 1487.—VERTICAL SECTION THROUGH THE SKIN, CUTIS, OF THE TRUNK IN THE REGION OF THE ARCH OF THE RIBS. ONE OF THE SMALL HAIRS OF THE SKIN IS SEEN IN LONGITUDINAL SECTION. SUDORIFEROUS GLANDS OR SWEAT GLANDS AND THEIR EFFERENT DUCTS.

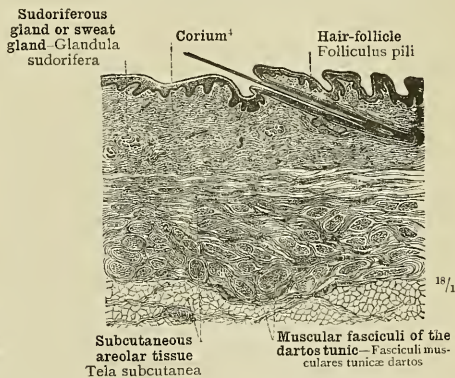


FIG. 1488.—VERTICAL SECTION THROUGH THE SKIN, CUTIS, AND THE DARTOS TUNIC, TUNICA DARTOS, OF THE SCROTUM. THE MUSCULAR FASCICULI OF THE LATTER ARE CUT ACROSS. ONE OF THE PUBIC HAIRS IS SEEN IN LONGITUDINAL SECTION. SUDORIFEROUS GLANDS OR SWEAT GLANDS.

¹ Regarding the German use of the term *lanugo*, see Appendix, note 532.

² By Macalister named *erector pili muscle*, but the form used in the text is that most generally employed.

³ See Appendix, note 539.

⁴ The *corium* is also known as the *derma*, *cutis vera*, or *true skin*.

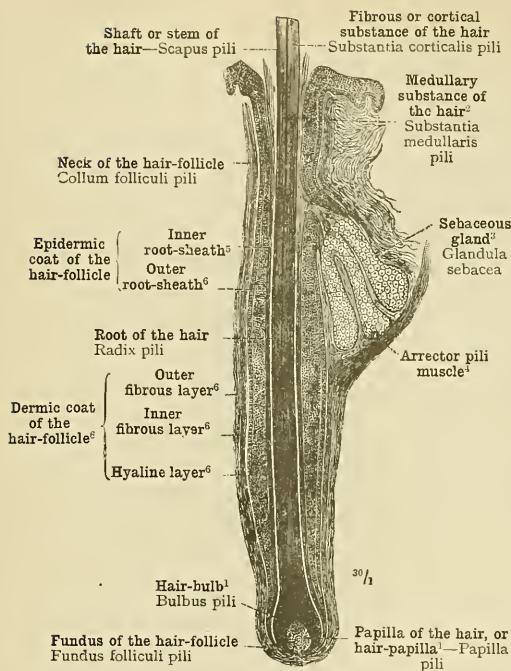


FIG. 1489.—A HAIR OF THE HEAD (CAPILLUS) STILL IN COURSE OF GROWTH, WITH HAIR-BULB, BULBUS PILI,¹ IN LONGITUDINAL SECTION. HAIR-FOLLICLE, SEBACEOUS GLAND OR FOLLICLE, GLANDULA SEBACEA, AND ARRECTOR OR ERECTOR PILI MUSCLE.

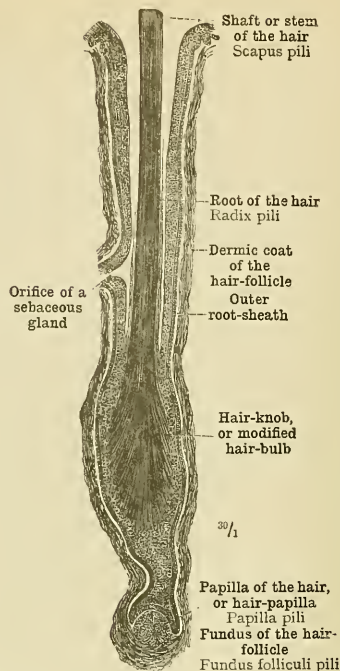


FIG. 1490.—A HAIR OF THE HEAD (CAPILLUS) ABOUT TO BE SHED, WITH HAIR-KNOB OR MODIFIED HAIR-BULB,¹ IN LONGITUDINAL SECTION. HAIR-FOLLICLE, AND PAPILLA OF THE HAIR THAT IS ABOUT TO DEVELOP IN PLACE OF THE OLD ONE.

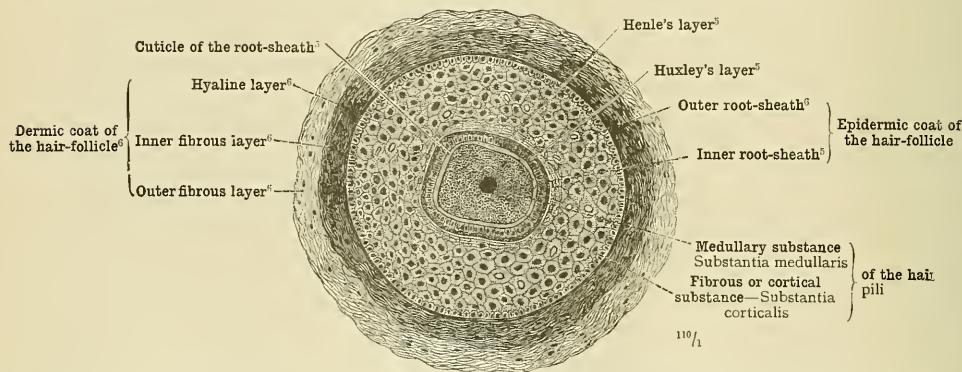


FIG. 1491.—A MOUSTACHE HAIR WITH ITS HAIR-FOLLICLE IN TRANSVERSE SECTION. THE LAYERS OF THE HAIR FOLLICLE (see Appendix, notes 561 and 562).

¹ See Appendix, note 560.

³ Or sebaceous follicle.

² Also called more shortly the *medulla* or *pith* of the hair.

⁴ See note 2 to p. 951.

⁵ See Appendix, note 564.

⁶ See Appendix, note 562.

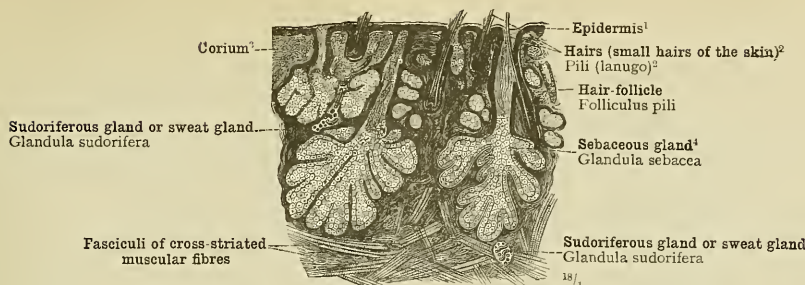


FIG. 1492.—VERTICAL SECTION THROUGH THE SKIN OF THE ALA NASI. SEBACEOUS GLANDS OR FOLLICLES, GLANDULÆ SEBACEÆ, WITH THE SMALL HAIRS OF THE SKIN, LANUGO (see Appendix, note ⁵⁹³). SUDORIFEROUS GLANDS OR SWEAT GLANDS, GLANDULÆ SUDORIFERÆ. CROSS-STRIATED MUSCULAR FIBRES ENTERING THE SKIN.

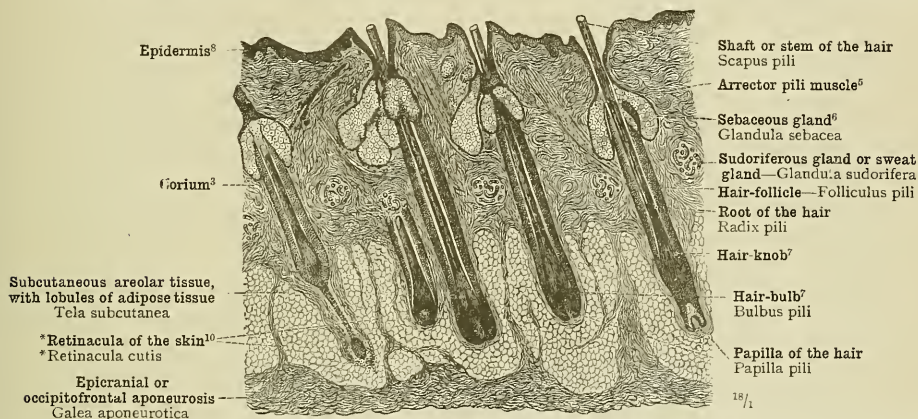


FIG. 1493.—VERTICAL SECTION THROUGH THE SKIN OF THE HEAD. HAIRS OF THE HEAD, CAPILLI, IN LONGITUDINAL SECTION, WITH SEBACEOUS GLANDS OR FOLLICLES AND MUSCLES OF THE HAIR-FOLLICLES, MUSCULI ARRECTORES VEL ERECTORES PILORUM. SUDORIFEROUS GLANDS OR SWEAT GLANDS.

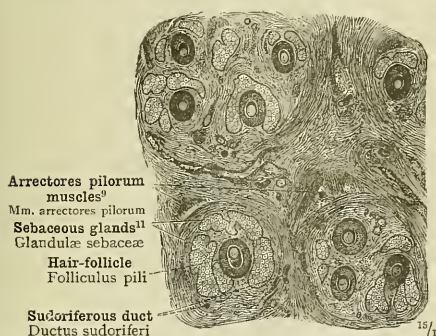


FIG. 1494.—HORIZONTAL SECTION THROUGH THE SKIN OF THE HEAD AT THE LEVEL OF THE SEBACEOUS GLANDS OR FOLLICLES. HAIR-FOLLICLES, FOLLICULI PILORUM, AND MUSCLES OF THE HAIR-FOLLICLES, MUSCULI ARRECTORES VEL ERECTORES PILORUM, IN OBLIQUE SECTION.

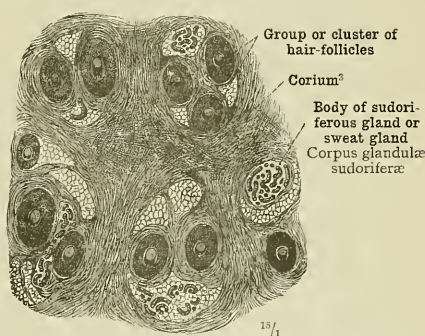


FIG. 1495.—HORIZONTAL SECTION THROUGH THE SKIN OF THE HEAD AT THE LEVEL OF THE SUDORIFEROUS GLANDS OR SWEAT GLANDS. HAIRS, CAPILLI, AND HAIR-FOLLICLES, FOLLICULI PILORUM, IN OBLIQUE SECTION.

¹ See Appendix, note 559. ² Regarding the German use of the term *lanugo*, see Appendix, note 593. ³ The *corium* is also known as the *derma cutis vera*, or true skin. ⁴ Or *sebaceous follicle*. ⁵ See note ² to p. 951.
⁶ Or *sebaceous follicle*. ⁷ See Appendix, note 560. ⁸ See Appendix, note 559. ⁹ By Macalister named *erectores pilorum muscles*, but the form used in the text is that most generally employed.
¹⁰ See Appendix, note 593. ¹¹ Or *sebaceous follicles*.

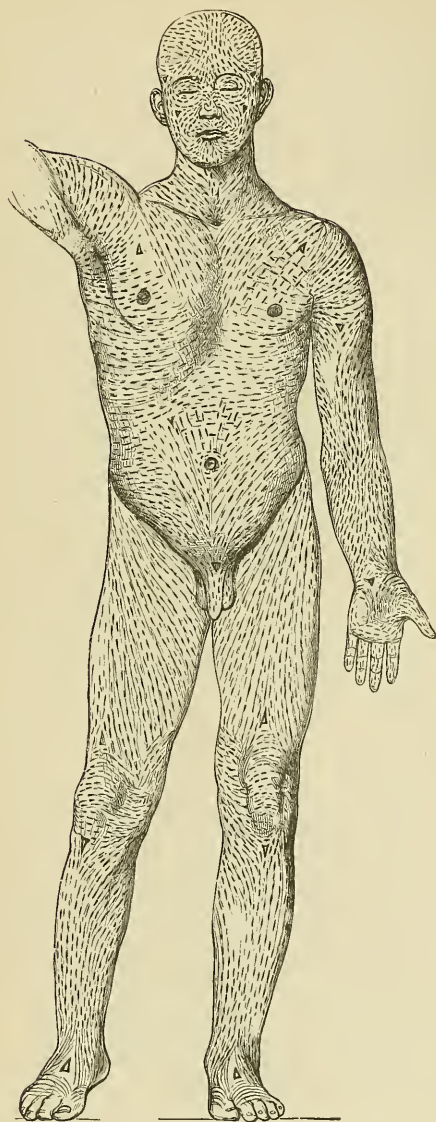


FIG. 1496.—ANTERIOR SURFACE.

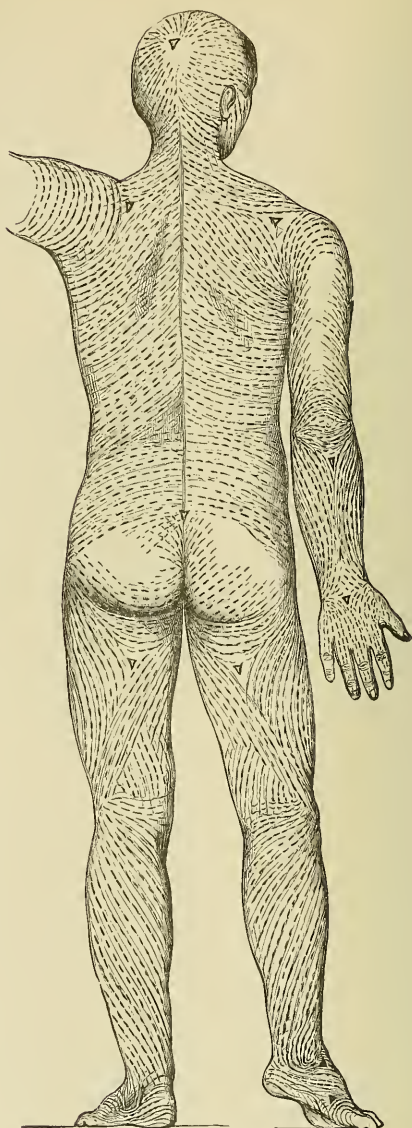


FIG. 1497.—POSTERIOR SURFACE.

THE GENERAL COURSE OF THE CONNECTIVE-TISSUE BUNDLES OF THE CORIUM, DETERMINED BY THE DIRECTION ASSUMED BY THE LINEAR CLEFTS MADE IN THE SKIN WHEN IT IS PUNCTURED BY A ROUND AWL.¹ (AFTER C. LANGER.)

¹ See Appendix, note 564.

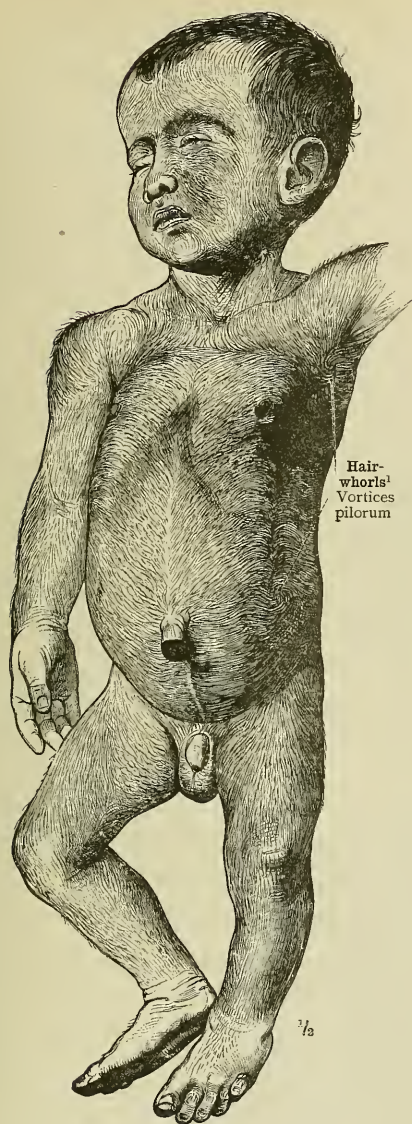


FIG. 1498.—ANTERIOR SURFACE.

THE DIRECTION OF THE HAIRS ON THE DIFFERENT PARTS OF THE BODY. FÆTUS IN THE NINTH MONTH OF INTRA-UTERINE LIFE (MONTHS OF FOUR WEEKS EACH).

¹ See Appendix, note 54.

² See note 3 to p. 528, in Part IV.

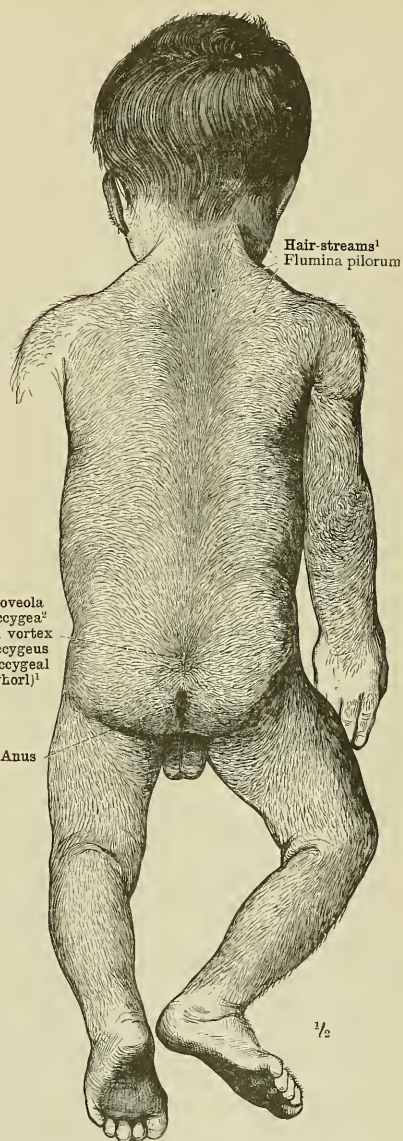


FIG. 1499.—POSTERIOR SURFACE.

Hair-streams—Flumina pilorum.—Hair-whorls—Vortices pilorum (see note ¹ above).

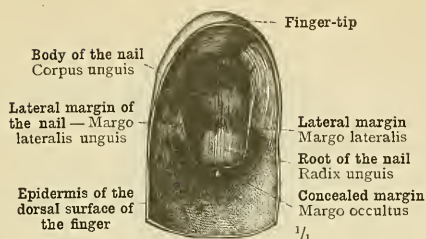


FIG. 1500.—THE FINGER-NAIL, WITH THE ADJOINING AREA OF EPIDERMIS, DETACHED FROM THE CORIUM BY THE ACTION OF SUPERHEATED STEAM. SEEN FROM THE CONCAVE SIDE.



FIG. 1501.—FINGER-NAIL, COMPLETELY ISOLATED. SEEN FROM THE CONVEX SIDE.

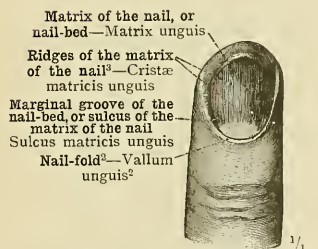


FIG. 1502.—THE MATRIX OF THE NAIL OR NAIL-BED, MATRIX UNGUIS, WITH THE NAIL-FOLD AND NAIL-WALLS, VALLUM UNGUIS,² DISPLAYED BY THE REMOVAL OF THE EPIDERMIC PORTION OF THE NAIL OR NAIL PROPER AND THE SURROUNDING EPIDERMIS.



FIG. 1503.—MATRIX OF THE NAIL OR NAIL-BED, WITH PARTLY OPENED MARGINAL GROOVE OF THE NAIL-BED, SULCUS MATRICIS UNGUIS.

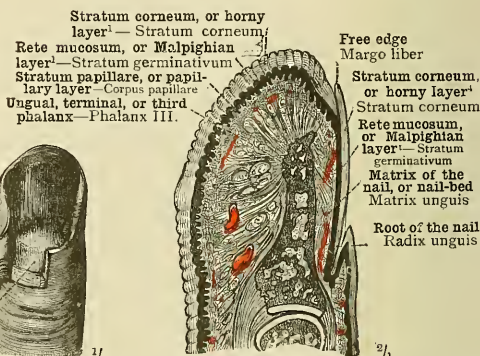


FIG. 1504.—LONGITUDINAL SECTION THROUGH THE NAIL AND THE TERMINAL PORTION OF THE MIDDLE FINGER.

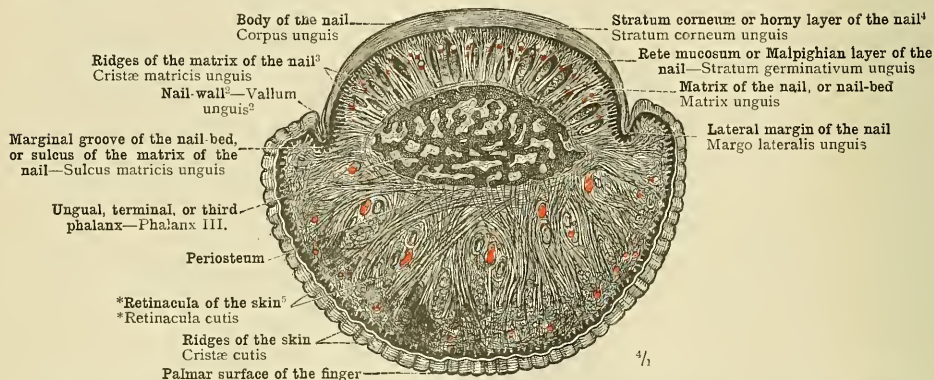


FIG. 1505.—TRANSVERSE SECTION THROUGH THE NAIL AND THE TERMINAL PORTION OF THE RING FINGER.

¹ See Appendix, note 559.

² See Appendix, note 556.

³ The ridges of the matrix of the nail are, according to Quain (*op. cit.*, vol. iii., part iii., p. 412), "sometimes, and perhaps more suitably, named *lunulae*."

⁴ See Appendix, note 557.

⁵ See Appendix, note 553.

APPENDIX TO PART VI.

NOTES BY TRANSLATOR

²¹⁸ *Neurilemma* (Figs. 1125, 1126, p. 746).—This forms the outermost covering of the medullated nerve fibres, and exhibits nuclei disposed at regular intervals along its inner surface. Since similar nuclei are seen also on the surface of the non-medullated nerve fibres, it is generally believed that these latter fibres also are invested with neurilemma (see Fig. 1126). As Ranvier, however, pointed out, it is difficult if not impossible to demonstrate the supposed sheath of the non-medullated fibres, and for this reason some histologists believe that the nuclei are imbedded in the peripheral layer of the fibre itself, and that the sheath is non-existent. The *neurilemma* or *neurolemma* (Quain prefers the latter spelling, which is, however, less often used than the former) is also known as the *primitive sheath*, or *sheath of Schwann*. It may be well to point out that the term *neurilemma* was formerly used to denote "the connective-tissue sheath wrapping round the whole nerve" (Foster), or "the connective-tissue sheath of the funiculus [see note ²²⁰ below], which is now known as the perineurium" (Quain); but, as Foster remarks ("Physiology," 5th ed., p. 115), "it seemed undesirable to use two such analogous terms as sarcolemma and neurilemma for two things obviously without analogy, and hence neurilemma is now used for that part of the nerve which is obviously analogous to the sarcolemma in muscle, viz., the sheath of the fibre."

²¹⁹ *Medullated and Non-Medullated Nerve Fibres* (Figs. 1124-1126, p. 746).—Nerve fibres are distinguished as *medullated* and *non-medullated* respectively according to the presence or absence of the *medullary sheath* (*white substance* of Schwann). Medullated fibres are known also as *double-bordered*, *double-contoured*, or *white fibres*; non-medullated fibres are known also as *pale fibres*; often, also, after their discoverer, they are termed *fibres of Remak*.

²²⁰ *Epineurium, Perineurium, and Endoneurium* (Fig. 1127, p. 746).—The peripheral nerves are invested by a *common sheath* of fibrous tissue (formerly known as the *cellular sheath*); from this sheath, septa of connective tissue pass inwards between the *secondary bundles* or *funiculi*, of which all but the very smallest peripheral nerves contain a plural number. The common sheath and the septa just mentioned constitute the *epineurium*, in which the minute vessels and nerves (*nervi nervorum*) for the nutrition and sensibility of the nerve trunk ramify. Each *funiculus* or *secondary bundle* contains a variable number of nerve fibres, and has therefore no determinate size; it is enclosed in a tubular sheath of connective tissue, known as the *perineurium*. Whereas the epineurium is fibrous in character, the perineurium is distinctly lamellar, and may be separated in the form of a tube from the bundle of fibres which it invests. From its inner surface septa pass inwards among the nerve fibres, dividing them into *primary bundles*, and these septa are continuous with, and are usually described as forming part of, the *endoneurium*, which, for the rest, consists of delicate fibrils of connective tissue, for the most part longitudinally disposed, enmeshing and supporting the individual nerve fibres. In the larger nerve trunks, which contain numerous funiculi, these branch and reunite in a plexi-

form manner. The *epineurium* and *perineurium* were formerly known indifferently as *neurilemma*; the reason for abandoning this nomenclature is given at the end of note ²¹⁸ above. The author does not make use of the term *epineurium*, and would seem in these figures to disregard altogether the *common sheath* of the nerves. Fig. 1127 is said to depict "a portion of the median nerve." As this "portion" is surrounded by laminated perineurium, it is, doubtless, part of a single funiculus, dissected out of the nerve trunk.

²²¹ *Recent Advances in the Histology of Nervous Tissue* (Figs. 1128 to 1131, p. 747).—As a result of recent investigations into the minute structure of the nervous system, more especially those of Golgi and Ramón y Cajal, certain new conceptions regarding that structure have arisen, accompanied by a new nomenclature, in exposition of which I quote the following passage from the fourth edition of Halliburton's "Physiology," pp. 195, 196: "The whole nervous system consists of nerve cells and their branches, supported by neuroglia in the central nervous system, and by connective tissue in the nerves. Some of the processes of a nerve cell break up almost immediately into smaller branches, ending in arborescences of fine twigs; these branches, which used to be called protoplasmic processes, are now termed *dendrons*, and the fine twigs *dendrites*; one branch becomes the long axis-cylinder of a nerve fibre, but it also ultimately terminates in an arborization. It is called the *axis-cylinder process*, or, more briefly, the *axon*. The term *neuron* is applied to the complete nerve unit—that is, the body of the cell, and all its branches. Some observers have supposed that the axis-cylinder process is the only one that conducts nerve impulses, the dendron being rootlets which suck up nutriment for the nerve cell. This exclusive view has not, however, been generally accepted; the dendrons may be nutritive, but it is believed that they also, like the rest of the nerve unit, are concerned in the conduction of nerve impulses. A strong piece of evidence in this direction is the fact that the fibrils of the axis-cylinder may be traced through the body of the cell into the dendrons."

"The next idea which it is necessary to grasp is, that each nerve unit (cell plus branches of both kinds) is anatomically independent of every other nerve unit. There is no anastomosis of the branches from one nerve cell with those of another; the arborizations interlace and intermingle, and nerve impulses are transmitted from one nerve unit to another, but not by continuous structures. The impulses are transmitted through contiguous, but not through continuous, structures. A convenient expression for the intermingling of arborizations is *synapse* (literally, a clasping)." The axis-cylinder process, or axon, was originally supposed to be unbranched, but Golgi's chromate of silver method, by means of which the nerve fibrils may be followed to their finest ramifications, has demonstrated that this view was erroneous, and that lateral branches invariably pass from the axon into the adjacent nerve tissue. These branches are known as *collaterals*.

³²² *Plexus and Network* (Fig. 1132, p. 748).—I employ the phrase *terminal network* as the literal translation of the German word *Endnetz*, which is used by the author in the original. It is, however, a moot point whether this terminal ramification of the sensory nerves of the cornea is a true *network* or merely a *plexus*. The fact that the slender filaments exhibit no varicosities at their points of junction suggests rather the latter conclusion. The distinction between a *nervous network* and a *nervous plexus* is explained by Quain in the following terms ("Anatomy," 10th ed., vol. i., part ii., p. 347): "In the former an actual fusion of the ultimate fibrillæ which result from the division of the axis-cylinders of the nerves is assumed to take place, whereas in the latter, although there may appear to be an intimate union between the different nerves which enter into the plexus, this union does not extend to the ultimate elements of the nerve fibre; in other words, although fibres or parts of fibres (fibrillæ) may be given and received by the several nerves to and from one another, these fibres (in the case of the larger plexuses) or fibrillæ (in the microscopic plexuses) remain completely distinct, although they may run in close juxtaposition. Nervous plexuses are of very common occurrence, both those of the larger sort which have long been recognised by anatomists, and the smaller microscopic plexuses which are often found near the endings, both of some centripetally conducting and of some centrifugally conducting nerves. But nervous networks are far less frequent than has been supposed, although they were until lately described as a mode of nerve termination not by any means rare; and, indeed, their existence is now doubted altogether by some histologists."

³²³ *Free Ends of Corneal Nerves* (Fig. 1133, p. 748).—It is a disputed point whether sensory nerve terminals ever actually penetrate the cells of the tissue to which they are distributed. In his description of Fig. 1133, the author shelves the question by stating that "the nerve fibrils end freely in the epithelium" (*freie Endigung der Nervenfasern im Epithel*), which may signify either *between* the cells of the epithelium or *in the interior* of these cells. Concerning this matter Quain writes (*op. cit.*, vol. iii., part iii., p. 23): "An actual connexion of these nerves with the corpuscles of the cornea probably never occurs; although, since the fine nerve fibrils run in the anastomosing cell spaces, they come into close connexion with the corpuscles and their processes, and they have therefore been described by some observers as being actually continuous with the latter." (The passage as written is, unfortunately, to some degree ambiguous, owing to the repetition of the word *connexion* in a changed sense; it is obvious, however, that in the second instance *contact* is denoted.)

³²⁴ *Touch Corpuscles* (Fig. 1134, p. 749).—Also known as *tactile corpuscles* (*corpúscula tactis*) or *touch bodies*. In Germany they are distinguished as *Meissner'sche Tastkörperchen*, Meissner, with Thomas Wagner, having been their discoverer.

³²⁵ *Pacinian Corpuscles* (Fig. 1137, p. 749).—Called also *Pacinian bodies*, and sometimes *corpuscles of Vater*. They were described by Vater in 1741; but their internal structure and their necessary connexion with nerve fibres was first demonstrated, at a much later date, by Pacini.

³²⁶ *Henle's Sheath* (Figs. 1134 to 1137, p. 749).—This sheath is not mentioned by the author. It is derived from the *perineurium* (see note ³²⁰ above), which accompanies the nerves as they subdivide, and ultimately, in the finest branches, becomes reduced to a single lamella of connective tissue, covered within and without by a pavement epithelium (endothelium). Its importance in this connexion depends on the fact that the nucleated connective-tissue capsules of all the tactile end-organs are con-

tinnous with and derived from the sheath of Henle. A prolongation of this sheath passes over the motorial end-organs, also forming a nucleated covering called by Kühne the *telolemma* (*epilemma* according to Macalister); further, the *neurilemma* or *sheath of Schwann* being continuous with the sarcolemma, the motorial end-organ has a second covering within that derived from the sheath of Henle; this is sometimes called the *endolemma*.

³²⁷ *Olivary Body* (Figs. 1141, 1143, p. 752).—This is called by Quain the *lower olive*. As far as human descriptive anatomy is concerned, the qualification is perhaps superfluous, the *superior olivary nucleus*, from which it is thus distinguished, being situated in man deep within the substance of the pons Varolii, and not giving rise to any superficial prominence similar to that from which the *lower olive* derives its name. In their internal structure, however, and in the size of their cells, the *superior* and the *inferior olive* exhibit, even in man, close resemblances; and in some animals, in which the superior olivary nucleus is proportionately much larger than in the case of the human brain, the outline of this body is distinctly sinuous, a fact which makes the similarity to the *corpus dentatum* of the inferior olive even more striking.

³²⁸ *Pyramids* (Fig. 1141, p. 752).—These are sometimes called the *anterior pyramids* to distinguish them from the *posterior pyramids*, an alternative name (seldom employed) for the *funiculi graciles* with their *clavae*.

³²⁹ *Enlargements of the Spinal Cord* (Figs. 1141, 1142, p. 752).—These are variously named (1) *cervical* and *lumbar*, from the regions of the cord in which they are respectively situated; (2) *brachial* and *cervical*, from the functions they respectively subserve; and (3) *upper* and *lower*, from their relative position. The names first mentioned are those in general use.

³³⁰ *White Columns of the Spinal Cord* (Figs. 1141 to 1143, p. 752).—The posterior grey column (posterior horn—see note ³²⁹ below) almost reaches the surface of the cord along the posterolateral groove (see note ³²³ below) and the line of attachment of the posterior root, thus distinctly separating the *posterior white column* from the rest of the cord; the anterior extremity of the anterior grey column (anterior horn), on the other hand, is some distance from the surface, and the bundles of the anterior nerve roots do not emerge along a defined vertical line, so that there is no distinct boundary between the *anterior* and the *lateral white column*. For this reason many anatomists divide the white matter of the cord into *posterior* and *anterolateral white columns* only.

³³¹ *Medulla Oblongata* (Fig. 1142, p. 752).—Quain gives *spinal bulb* as an alternative name, but the term is not in use; it is a translation of the Latin *bulbus rhachiticus*, a name used by Meckel.

³³² *Posterior Median Groove* (Figs. 1141, 1142, p. 752).—It will be noticed that the author speaks of the *sulcus medianus posterior* in contradistinction to the *fissura mediana anterior*. In England the terms *anterior* and *posterior median fissure* are in common use. The author's terminology is, however, to be preferred, for the anterior cleft only, though much shallower than the posterior, is a true fissure, both sides of which are lined with pia mater. Along the posterior median line of the cord is a shallow groove merely, the *posterior median groove*, from the bottom of which a cleft extends inwards nearly to the centre of the cord. This cleft is occupied, not by the pia mater, but by a thin stratum of connective tissue and bloodvessels connected with that membrane, known as the *posterior median septum* (see Fig. 1149, p. 755).

³³³ (Fig. 1143, p. 752.) The terms *pars cervicalis*, *pars thoracalis*, and *pars lumbalis* (cervical, dorsal, and lumbar portions of the cord), as used by the author, refer to the divisions of the cord occupying respectively the cervical, dorsal, and lumbar portions of the spinal canal, and have no bearing on the functional divisions of the cord, represented by the *cervical* or *brachial* and *lumbar* or *crural* enlargements, and the intermediate dorsal portion of the cord (see note ³²⁹ above).

³³⁴ *Medulla Spinalis*.—The term *spinal marrow*, a literal translation of the Latin term *medulla spinalis*, is still found in the textbooks as an alternative name for the *spinal cord*.

³³⁵ *Sulcus Lateralis Anterior et Posterior*; *Sulcus Intermedius Anterior et Posterior* (Figs. 1144 and 1145, p. 753).—"An antero-lateral groove has sometimes been described in the line of origin of the anterior roots of the nerves, but usually has no real existence. The fibres of these roots, in fact, unlike the posterior, do not dip into the spinal cord in one narrow line, but spread over a space of some breadth" (Quain, *op. cit.*, vol. iii., part i., p. 7). The *postero-lateral groove*, on the other hand, is a clearly marked furrow corresponding with the line of attachment on each side of the posterior roots of the spinal nerves. (See also note ³²⁹ above.) In the upper part of the cord a furrow is seen on either side about 1 millimetre from the posterior median groove (see note ³³² above); this, which is better marked in some individuals than in others, is known as the *posterior intermediate groove* (or *furrow*); it serves, in the cervical region, to mark off the *postero-mesial* from the *postero-lateral* column (see note ³⁴⁸ below); from the bottom of the groove an incomplete septum of connective tissues analogous to the posterior median septum, and known as the *posterior intermediate septum*, extends into the substance of the cord between the columns just named (see Fig. 1149, p. 755). An *anterior intermediate groove* (or *furrow*), *sulcus intermedius anterior*, is shown in Fig. 1144 as a variety.

³³⁶ *Fossa Rhomboidea* (Fig. 1145, p. 753).—According to Quain, this (or, strictly speaking, the term *fossa rhomboidalis*—see note ³³⁵ below) is an alternative name for the *fourth ventricle*, but by the author its signification is limited to the floor of that cavity. The part of the ventricle seen in Fig. 1145, viz., its pointed lower extremity, is known as the *calamus scriptorius*, on account of its resemblance to a writing-pen. (See also Fig. 1178, p. 768.)

³³⁷ *Tuberculum Cuneatum* (Ibid.).—"On a level with the adjoining clava of the funicular gracilis, the enlarged part of the cuneate funiculus also, like that, exhibits a slight eminence, which is best marked in children, and has been called the *cuneate tubercle*" (Schwalbe, quoted by Quain, *op. cit.*, vol. iii. part i., p. 44).

³³⁸ **Terminal Ventricle* (Fig. 1146, p. 753).—"At the apex of the *conus medullaris* the central canal of the cord is considerably enlarged, to form what is known as the *ventriculus terminalis*, and below this, narrowing once more, it may be traced for some distance in the interior of the *filum terminale*" (Von Langer and Toldt's "Anatomy," 7th ed., p. 584). This term is not used by Quain or Macalister.

³³⁹ *Grey Columns of the Spinal Cord* (Fig. 1147, p. 754).—It is to some extent an innovation in English anatomical nomenclature to employ the term *column* in speaking of the grey matter. The author, it will be noted, distinguishes the *white columns* as *funiculi* from the *grey columns*, which he terms *columnae*. In England the grey matter of the spinal cord is, as a rule, divided into three horns—*anterior* or *ventral*, *posterior* or *dorsal*, and *lateral horn*—on each side. Now, while this terminology expresses

accurately enough the appearance of the grey matter of the cord as seen in transverse section, it fails entirely to represent its tridimensional aspect, for which purpose the use of the term *column* is obviously the most appropriate. The word is already in common use for one section of the grey matter, viz., the *posterior vesicular column* of Lockhart Clarke (commonly spoken of as *Clarke's column*); Quain, further, as well as other authorities, speaks of various longitudinal tracts of grey matter rich in cells as *ganglionic* or *cell columns*; so that there is no valid objection to the substitution of the more accurate term, *columns*, for the more familiar term, *horns*, of the grey matter. Any possible confusion between the white and the grey columns of the respective anterior, lateral, and posterior regions of the cord can be avoided by the invariable addition of the qualifying adjective *white* or *grey* as the case may be. The alternative reform in the nomenclature, the adoption of the author's term *funiculus* in speaking of the white columns, appears to me to be a less desirable one, and less likely to be accepted.

³⁴⁰ *Veins of the Spinal Cord* (Fig. 1148, p. 754).—According to Quain, two median longitudinal veins, anterior and posterior, are the most important veins of the spinal cord. Von Langer and Toldt (whose nomenclature I have in this instance adopted) write as follows: "The veins of the spinal cord fall into two groups: the *external spinal veins*, *venae spiniales externae anteriores et posteriores*, which accompany the arteries in front and behind the cord; and the *internal spinal veins*, *venae spiniales internae*, which run in the substance of the cord beside the central canal; radiating branches connect these two systems of veins, and pass outwards to the *internal vertebral venous plexuses*, *plexus venosi vertebrales interni*" (*op. cit.*, p. 599).

³⁴¹ *Commissures of the Cord* (Figs. 1149 and 1150, p. 755).—The *commissure of the cord*, says Gowers, "consists of two parts: an *anterior* or *white* and a *posterior* or *grey commissure*" ("Diseases of the Nervous System," 2nd ed., vol. i., p. 184). A similar account is given by most English anatomists. The *posterior* or *grey commissure*, as its name implies, consists, like the *anterior* or *white commissure*, of connecting fibres, but in the case of the former there is a large amount of neuroglia amongst the fibres, and this gives the commissure a grey aspect. Toldt, as Fig. 1149 shows, divides the commissure of the cord into three parts: a *posterior commissure*, an *anterior grey commissure*, and an *anterior white commissure*. This difference depends merely on the fact that, while English anatomists describe the central canal of the spinal cord as being situated in the centre of the *posterior* or *grey commissure*, Toldt regards the fibres behind that canal as forming the *posterior commissure*, while the portion of the *grey commissure* in front of the canal he calls the *anterior grey commissure*; and in front of this, again, is situated the *anterior white commissure*.

³⁴² *Collateral Fibres of the Posterior Roots* (Fig. 1150, p. 755).—Recent researches have shown that the fibres of the posterior roots bifurcate as they enter the cord into two principal branches which ascend or descend respectively in the posterior white column or the adjacent part of the posterior grey column (posterior horn—see note ³³⁹ above). From these branches, as well as from the root fibre before it bifurcates, numerous *collaterals* (see note ³²¹ above) are given off in four principal directions: (1) to the anterior grey column (anterior horn) of the same side, (2) by the posterior commissure to the grey matter of the opposite side, (3) to the lateral grey column (lateral horn), (4) to the posterior grey column (posterior horn) of the same side, especially to the *substantia gelatinosa* of Rolando, the solitary cells, and to the posterior vesicular column

of Lockhart Clarke (the last-named are the fibres shown in Fig. 1150). Ultimately these collaterals divide frequently to form a ramification of nerve fibrils intimately associated with the nerve cells of the grey matter. The bifurcation of the posterior root fibre and the offset of the collaterals is shown diagrammatically in Fig. 1140, p. 750.

³⁴⁵ *Dorsal Nucleus* (Ibid.).—The *posterior vesicular column* of Lockhart Clarke was called by Stilling the *nucleus dorsalis*, and by Macalister the *visceral column*.

³⁴⁴ *Direct Lateral Cerebellar Tract* (Ibid.).—This tract, called by the author *fasciculus cerebellospinalis*, is somewhat variously named by English authorities. Foster calls it simply the *cerebellar tract*; but this name is inadequate, as other tracts in the cord are connected with the cerebellum. Gowers calls it the *direct cerebellar tract*; Halliburton, the *dorsal or direct cerebellar tract*; Quain, finally, employs the precise but cumbersome name, *dorsolateral ascending cerebellar tract*. I believe, however, that Flechsig's name, *direct lateral cerebellar tract*, is that generally employed, and as it is sufficiently distinctive and at the same time fairly concise, I have adopted this name in the text.

³⁴⁵ *Septum Posticum of the Subarachnoid Space of the Spinal Cord* (Ibid.).—For an account of this structure, which is called by the author the *septum subarachnoidale*, see Quain, *op. cit.*, vol. iii., part i., p. 188.

³⁴⁶ *Anterolateral Ascending Tract* (Fig. 1151, p. 756).—The author's name for this is *fasciculus anterolateralis superficialis*, with an alternative German name of *Gowers'scher Strang*—i.e., *tract of Gowers*. Quain calls it the *ventrolateral or anterolateral ascending cerebellar tract*. Halliburton gives both the names used in the text, as alternatives to *ventral cerebellar tract*, to which latter he gives the first place. Foster calls it the *anterolateral ascending tract*. It is hardly correct to qualify it, as Quain does, as *cerebellar*, for many of the fibres of the tract terminate, not in the cerebellum, but in the corpora quadrigemina. The truly cerebellar portions of this tract may, however, as Foster suggests, be regarded as "simply a more diffuse and outlying part of the [direct lateral] cerebellar tract" (*op. cit.*, p. 895).

³⁴⁷ *Lateral and Anterior Ground Fibres of Flechsig and Lateral Limiting Layer* (Ibid.).—The *lateral* and the *anterior ground fibres* (*fasciculi lateralis et anterior proprii Flechsigi*) consist of the fibres which are subject to neither ascending nor descending degeneration as a result of experimental or accidental section of the spinal cord; this region, which in section has the form of a crescentic strip of white matter surrounding the front of the posterior horn, the lateral horn, and the anterior horn of the cord, is supposed to be made up of commissural fibres "connecting the segmental mechanisms of the same lateral half of the spinal cord with each other" (Foster). Gowers describes the hindmost portion of the *lateral ground fibres*, that which intervenes between the front of the lateral or crossed pyramidal tract and the grey matter, as the *lateral limiting layer*. This separation, however, like that between the *lateral* and the *anterior ground fibres*, is made purely for descriptive purposes, and has no physiological significance, there being no difference as regards structure or development or (as far as our present knowledge goes) function between the fibres of these areas.

³⁴⁸ *Tracts of the Posterior White Column* (Ibid.).—This column is chiefly made up of two tracts, the *tract of Goll* and the *tract of Burdach*, which are separated from one another by the posterior intermediate septum (see note ³³⁵ above). In the author's nomenclature they are known respectively as the *fasciculus gracilis* and the *fasciculus cuneatus*, the former being continued into the *funiculus gracilis*, and the latter into the *funiculus cuneatus*,

of the medulla oblongata. Quain calls them *posteroventral* and *posterolateral columns*, as alternative names to *tract of Goll* and *tract of Burdach*. They are often known in England as *column of Goll* and *column of Burdach*, but the name *tract* is to be preferred, as harmonizing with the nomenclature of the other tracts which have been differentiated in the cord by physiological research.

³⁴⁹ *Classification of the Nerve Cells of the Spinal Cord* (Fig. 1152, p. 756).—I quote from Von Langer and Toldt's "Anatomy" (7th ed., pp. 588, 589) a passage which explains the names given to the nerve cells in Fig. 1152: "We may distinguish in the spinal cord three varieties of nerve cells [ganglion cells], the differential characteristic being the destination of their nerve processes. (1) The *motor cells* of the anterior grey columns [or anterior horns—see note ³³⁹ above,] whose axis-cylinder processes [axons—see note ³²⁸ above] are directly continued into motor nerve fibres, and as such constitute the anterior nerve roots. (2) The *tract cells* [*Strangzellen*], whose nerve processes pass into the white matter, in which they run for a space, giving off collaterals [see note ³²¹ above] at intervals; sooner or later they, and their collaterals also, re-enter the grey matter, and there break up into terminal arborizations (*Enddäumchen*)—(the individual fine twigs of the arborizations are called *dendrites*; see note ³²² above). These cells are especially numerous in the region between the anterior and posterior horns. Those tract cells whose processes cross the median plane in the anterior or white commissure of the cord are distinguished as *commissural cells*. (3) The *intercalary cells* [*Binnenzellen*, *Schaltzellen*], which are much fewer in number than the cells belonging to the other two varieties; their nerve processes do not enter the white substance, but divide within the grey matter into very fine fibrils [dendrites]. They are most numerous in the posterior grey columns [posterior horns]." I have not been able, in the English works at my disposal, to find a classification of the nerve cells of the spinal cord based on the same consideration as that given in the above quotation; hence my rendering of the author's terms *Strangzellen*, and *Binnenzellen* or *Schaltzellen* (for which he gives no Latin equivalents), are neologisms. *Tract cells* is obviously the best rendering of the first, since *Strang* is the German equivalent of the *tract* of the spinal cord of English authors. *Binnenzellen* or *Schaltzellen* I have translated by the words *intercalary cells*, in place of using the more familiar word *intermediate*, in order to avoid confusion with the cells of the *intermediate process* of Gowers (*lateral horn*, or *intermediolateral tract*—see note ³ to p. 754). The term *Binnenzellen* is not used in Fig. 1152, but apparently the term *Golgi'sche Zelle* is used with the same significance (see note ³⁵⁰ below). In conclusion, I may remind the reader that the usual English classification of the nerve cells of the spinal cord is based, not so much on their structural peculiarities or the destination of their processes, as on their arrangement in columns. The *motor cell column*, or the *cell column of the anterior horn*, is, however, made up entirely of the *motor cells* comprising Toldt's first group; further, the other principal cell columns—viz., *Clarke's column* (see note ³⁴⁵ above), the *lateral cell column*, the *middle cell column*, and many of the *cells of the posterior grey column*—consist of Toldt's second group of cells, the *tract cells*; finally, the *intercalary cells* of this author would appear to be identical with those generally known in England as the *solitary cells* of the posterior horn, of which Quain writes (*op. cit.*, vol. iii., part i., p. 17): "Some of the axis-cylinder processes of these cells do not leave the grey matter, but are branched, and their ramifications lose themselves in the interlacement of fibrils which invests other cells."

³³⁰ **Golgi's Cells* (Ibid.).—It was not at first clear to me what cells in particular the author intended to denote by this name. In spite of the fact that so much of our knowledge of the intimate structure of the nervous system is derived from Golgi's work, no structure (except the *corpuscle of Golgi* or *organ of Golgi* found as a sensory nerve terminal in tendons) has hitherto been associated with the name of this investigator, nor is the term *Golgi'sche Zelle* to be found even in Von Langer and Toldt's "Text-book of Anatomy." These authors' classification of multipolar nerve cells serves, however, to throw light on the difficulty. They write (p. 572, 573): "There are three principal forms of multipolar nerve cells [ganglion cells]. In one kind of these—the first type of Golgi—we find among the numerous processes one always which remains unbranched or gives off only a few fine collaterals, and this process, on account of its close resemblance to an axis-cylinder, is known as the *axis-cylinder process* [or *axon*; in German *Neurit*]; after a short course it acquires a medullary sheath, and is thus transformed into a medullated nerve fibre. The other processes resemble undifferentiated protoplasm in appearance, and divide again and again until the ultimate fibrils almost cease to be visible from their extreme tenuity; they are known as *protoplasmic processes* [*dendrons* and *dendrites*]; whether they are connected with nerve fibres is a matter not yet determined. . . . In a second kind of multipolar nerve cells [ganglion cells]—the second type of Golgi—the cell has, in addition to numerous dendrons, like the first kind, one axis-cylinder [axon] only; this last, however, instead of becoming transformed into a long nerve fibre, soon breaks up into an abundant arborization [the German word is *Netz*, literally *network*, but see note ³²² above]; cells of this type are met with in the posterior horns of the spinal cord and in the inner or granule layer of the grey matter of the cortex of the cerebellum. Multipolar nerve cells [ganglion cells] of the third kind are distinguished by the fact that they have no dendrons, all their processes being continuous with nerve fibres; cells of this kind are met with in the ganglia of the sympathetic nervous system." If the data given here regarding the cells said to belong to the "second type of Golgi" be compared with those given in note ³²⁰ above regarding the *intercalary cells* (*Binnenzellen*), and are further taken in conjunction with the fact that the **Golgi's cell* shown in Fig. 1152 is in the posterior horn, and is unconnected with any of the tract fibres, we are led to conclude that the latter is an alternative name used by the author for the *intercalary cells*, and, finally, that these are the same as the *solitary cells* described in the quotation from Quain at the end of note ³²⁰ above.

³³¹ (Ibid.) The word *central* in these instances denotes merely "having connexions with the cerebrum," and must on no account be confused with "centripetal." In the case of the axis-cylinder process of the cell of Clarke's column, indeed, the fibre is centripetal, for it passes upwards in the direct lateral cerebellar tract, and if severed degenerates upwards. The (red) fibres passing from the anterior and lateral pyramidal tracts to the motor cell column, however, are centrifugal fibres.

³³² *Reflex Collaterals* (Fig. 1155, p. 757).—I quote the following passage from Von Langer and Toldt, *op. cit.*, p. 593: "Concerning the significance of the sensory (i.e., posterior) root fibres of the spinal cord, there still remains much that is obscure; but all the observations hitherto made support the view that the different connexions of the sensory collaterals represent different physiological activities of the sensory root fibres. We may mention as an especially noteworthy fact that those sensory collaterals which pass into the anterior grey columns (anterior

horns), and there invest the motor cells with terminal arborizations, would appear to be exceedingly well adapted for the direct transmission of sensory stimuli to a smaller or larger number of motor cells, and that in this manner they form the anatomical basis for the carrying out of reflex movements." These collaterals are those called *reflex collaterals* in Fig. 1155.

³³³ **Filum of the Spinal Dura Mater* (Fig. 1157, p. 758).—The *filum terminale*, or central ligament of the spinal cord, is a prolongation of the pia mater, enclosing for about half its length an enlarged continuation of the central canal of the cord, with a little grey matter near the upper end. As it perforates the dura mater, opposite the second sacral vertebra, it receives from that membrane a thin fibrous investment, which is called by the author **filum duræ matris spinalis*. The term is not used by Quain or Macalister.

³³⁴ *Metathalamus, Epithalamus, and Hypothalamus* (Fig. 1161, p. 760).—These terms are explained in the following quotation: "In the anterior half of the lateral wall of the *thalamencephalon* [*diencephalon*, *interbrain*, *second secondary vesicle*] a hemispherical eminence forms on each side, the *optic thalamus*. In the posterior half of the lateral wall of the *thalamencephalon*, three superimposed regions must be distinguished. The middle of these, lying immediately behind the optic thalamus, the *metathalamus*, develops into the *corpora geniculata*; the region above this, the *epithalamus*, develops into the *pineal body* or *gland* and the *ganglion of the habenula*. The lowest and largest of these three regions unites with a small portion of the *prosencephalon* or *first secondary vesicle* to form the *hypothalamus*. This is definitely marked off from the *thalamus* and the *metathalamus* by the *sulcus hypothalamicus* (*Monroi*), which arches downwards and forwards from the entrance to the aqueduct of Sylvius. The ventral wall of the hypothalamus remains much thinner than the ventral wall of the posterior parts of the brain, and exhibits, in contact with the base of the skull, two acute-angled recesses separated from one another by the optic commissure; the anterior of these is the *optic recess*, and the posterior is the *recess of the infundibulum*. The former is bounded in front by the *lamina cinerea* (*lamina terminalis*, according to Toldt), which, as a constituent of the *prosencephalon*, is continuous with the wall of the hemispheres. . . . The *hypothalamus* . . . belongs partly to the *prosencephalon*, and partly to the *thalamencephalon*. Thus, the *corpora albicantia* *seu mammillaria* and part of the *tuber cinereum*, making up the *pars mammillaria hypothalami*, belong to the *thalamencephalon*; whilst the remaining (and greater) portion of the *tuber cinereum*, with the *infundibulum*, and the posterior lobe of the *pituitary body* or *hypophysis cerebri*, as well as the *optic commissure* and the *lamina cinerea*, making up the *pars optica hypothalami*, belong to the *prosencephalon*" (Von Langer and Toldt's "Anatomy," 7th ed., pp. 623, 624).

³³⁵ **Rhomencephalon* (Fig. 1163, p. 761).—This term is used by the author to denote the *medulla oblongata*, the *pons Varolii*, the *cerebellum*, and the **isthmus rhomencephali* (see note ³²⁹ below), the solid parts, that is to say, which environ the *fourth ventricle*, the floor of which is known in Germany as *fossa rhomboidea*. (In England *fossa rhomboidalis* is an alternative name, seldom employed, for the fourth ventricle as a whole—see note ³³⁶ above.)

³³⁶ *Flexures of the Developing Brain* (Fig. 1164, p. 762).—These flexures, denoted by Quain simply as *first*, *second*, and *third cerebral flexures*, respectively, have no Latin names in the author's nomenclature. The German names are: for the *first flexure*, beneath the mid-brain, *Schädelkrümmung*—i.e., *parietal flexure*; for the *second flexure*, in the region of the pons, with the convexity directed forwards (the reverse of the first), *Brückenkrümmung*—i.e., *pontine flexure*; for the third, at the junction of the medulla

oblongata with the cord, likewise with a ventralwards convexity, *Macckenkrümmung*—i.e., *cervical flexure*.

³⁵⁷ (*Ibid.*). The fourth and fifth secondary vesicles (*epencephalon* and *metencephalon*, according to Quain) are developed from the posterior primary vesicle or hind-brain. Note that *metencephalon* is used by Toldt in a different sense, signifying not the fifth, but the fourth secondary vesicle.

³⁵⁸ *Mid-brain* (*Ibid.*).—Whereas the anterior and posterior primary vesicles give rise to two secondary vesicles each (first and second, fourth and fifth, respectively), the middle primary vesicle remains undivided as the third secondary vesicle. From this, the mid-brain or *mesencephalon*, are developed the aqueduct of Sylvius, the corpora quadrigemina, and the crura cerebri.

³⁵⁹ *Pineal Stria* or *Stria Medullaris* (Fig. 1169, p. 763).—This white stria runs along the upper curved margin of the lateral wall of the third ventricle, from the habenula of the pineal body behind to the anterior pillar of the fornix in front, and separates the inner from the upper surface of the optic thalamus. Owing to its connexion with the fornix, the *pineal stria* is known also as the *tania fornicis*, and this latter name, indeed, is that chiefly used by Quain to denote this structure. The name *tania fornicis* is, however, used by Toldt in a different sense—viz., to signify the line of attachment of the inner layer of the choroid plexus of the lateral ventricle to the outer free margin of the fornix. See Fig. 1203, p. 784, and Fig. 1204, p. 785, also note ³⁵⁹ below.

³⁶⁰ *Hypothalamus* and *Sulcus Hypothalamicus* (Monro) (Fig. 1173, p. 764).—The free internal surface of the optic thalamus, which forms the upper part of the lateral wall of the third ventricle, is bounded below by a sulcus which runs forwards from the anterior extremity of the aqueduct of Sylvius to the foramen of Monro. This is known as the *sulcus of Monro* (*sulcus hypothalamicus Monroi*), which is described neither by Quain nor by Macalister, though the latter authority depicts it in Fig. 778, p. 709, of his "Text-book of Human Anatomy." Von Langer and Toldt call this sulcus alternatively *sulcus limitans ventriculi tertii*—see note ³⁷⁷ below. The parts below the sulcus, forming the floor of the third ventricle, make up together what the author calls the **hypothalamus*. The use of this term in relation to the development of the brain has been already explained in note ³⁵⁴ above. The parts of the adult brain which, according to the Continental terminology, combine to form the hypothalamus are: (1) The *corpora albicantia seu mammillaria*, (2) the *tuber cinereum*, (3) the *pituitary body* or *hypophysis cerebri*, (4) the optic commissure or *chiasma* and the *optic tracts*, (5) the *lamina cinerea*. All these structures are shown in Fig. 1173, p. 764, except the *tuber cinereum*, which is depicted in Fig. 1174, p. 765.

³⁶¹ *Infundibulum* et **Recessus Infundibuli* (*Ibid.*).—The author draws a distinction between the *infundibulum*, the funnel-shaped downwardly projecting process at the base of the brain, behind the optic commissure, to the extremity of which the pituitary body is attached, and the **recess* of the *infundibulum*, the cavity in the interior of that process, which is part of the third ventricle. Quain and Macalister use the term *infundibulum* indifferently to denote either the process or its cavity.

³⁶² *Posterior Perforated Space* and **Anterior* and **Posterior Recess* (*Ibid.*).—The posterior perforated space (*locus perforatus posticus*) lies in a deep fossa (*fossa interpeduncularis Tarini*, the *interpeduncular fossa* of Tarini) between the diverging crura cerebri. Yet another name for the triangular space enclosed between the crura at the base of the brain is that used by Schwalbe—*trigonum interpedunculare*. The posterior angle of this triangular fossa is situate in the median line at the anterior

margin of the pons Varolii; this angle is called by Toldt **recessus posterior*. The anterior extremity of the interpeduncular fossa or posterior perforated space, the **recessus anterior* of Toldt, lies immediately behind the *corpora albicantia seu mammillaria*. The terms **anterior* and **posterior recess* are used neither by Quain nor by Macalister. The grey matter forming the floor of the space is called by Toldt *substantia perforata posterior*, and by Macalister the *posterior perforated plate*. The anterior part of this plate forms the posterior part of the floor of the third ventricle; but behind a line joining the anterior borders of the third nerves it forms the floor of the aqueduct of Sylvius.

³⁶³ *Pyramids* (*Ibid.*).—The *pyramids* of the medulla oblongata are sometimes distinguished as the *anterior pyramids*, the *funiculi graciles* with their *clavae* being by some anatomists called the *posterior pyramids*.

³⁶⁴ *Anterior Extremity of the Aqueduct of Sylvius* (*Ibid.*).—Immediately in front of the posterior commissure, the aqueduct of Sylvius expands abruptly to form the third ventricle. To this expansion the author gives the name of *aditus ad aqueductum cerebri*.

³⁶⁵ *The Pineal Body and its Connexions* (*Ibid.*).—As the accounts of the connexions of the *pineal body* or *glând* (*conarium*, *epiphysis cerebri*) given by Von Langer and Toldt, Quain, and Macalister, respectively, differ considerably, and this not merely in terminology, it is necessary, in order that the denotation of the terms used in Fig. 1173, p. 764, and in some later figures, may be clearly understood, to quote from the works of these authors. According to Von Langer and Toldt (*op. cit.*, p. 630), "The *pineal body* (*corpus pineale*) . . . is developed from the *epithalamus* [see Fig. 1161, p. 760, and note ³⁶⁴ above] . . . it projects freely from the roof of the mid-brain, between the upper or anterior pair of corpora quadrigemina, and is connected with these by a thin layer of white substance, which extends forwards from the base of the pineal body, and then curves downwards to become directly continuous with the quadrigeminal lamina; this layer of white substance forms the *posterior commissure* of the third ventricle. Above this there extends forward from the base of the pineal body an extremely thin layer of grey substance, the *commissura habenularum*, which extends on either side into a thin stria, the *peduncle of the pineal body* or *habenula*; and the habenula is further attached on both sides to the back of the optic thalamus by the intermediation of a triangular expansion, the *trigonum habenulae*, and of this last the *pineal stria* (*stria medullaris thalami*) [see note ³⁵⁹ above] is a direct forward continuation. Between the upper grey and the lower white medullary layer proceeding forwards from the base of the pineal body is a narrow pointed backward extension of the third ventricle, the *pineal recess* (*recessus pinealis*). . . The *velum interpositum* or *tela choroidea superior* forms the upper boundary, and the anterior half of the upper surface of the pineal body forms the lower boundary, of another pointed backward extension of the third ventricle, the *suprapineal recess* (*recessus suprapinealis*)." According to Quain (*op. cit.*, vol. iii, part i, p. 114), "the *pineal body* . . . is attached on each side by a broad but flattened stalk of white fibres (*pedunculus conarii*) which is separated by the pineal recess of the ventricle into a dorsal and a ventral portion. The ventral portion curves downwards; it belongs to the ventral portion of the posterior commissure. . . . The upper portion extends on each side along the ridge-like junction of the upper and mesial surfaces of the thalamus as the *pineal stria* or *tania fornicis* [see note ³⁵⁹ above]. At the sides the stalk merges into the *trigonum habenulae*." The term *habenula* is not employed by Quain in this passage, but elsewhere (p. 111) he mentions it as

an alternative name for the *peduncle of the pineal body*. Though this author describes the peduncle as consisting of white fibres, the middle of what he calls the *dorsal portion of the habenula* is identical with the *thin grey layer* constituting the *commissura habenularum* of Von Langer and Toldt. According to Macalister (*op. cit.*, p. 726), "On the inner side of each optic thalamus is a white streak, the *crus pinealis*, outside which is a grey band, the *habenula of the pineal body*, passing from the *ganglion habenula* or *trigonom habenula*; beginning below and in front, and coursing backwards along its upper and inner angle, to end by joining with a white band, the *transverse frænulum of the pineal body*. The junction between the habenula and frænulum is dilated into a small triangular knob, the *trigonom habenula*. Below and attached to this is a transverse white band, the *posterior commissure*, in reality a foremost portion of the mid-brain." Thus, Macalister extends the significance of the term *crus pinealis* to include the *pineal stria* (*stria medullaris thalami*—see note ³⁵⁹ above). The *commissura habenularum* of Toldt is the *transverse frænulum of the pineal body* of Macalister, which the latter anatomist, in agreement with Quain, describes as a *white band*. Macalister is peculiar in identifying the *ganglion habenula* and the *trigonom habenula*, the former term having been applied by Meynert to a collection of nerve cells in the interior of the latter. With regard to the biological significance of the structures above described, Macalister remarks (*op. cit.*, *loc. cit.*): "These habenal bands are possibly the remains of the optic nerve of the rudimentary median eye coming from the front of the optic thalamus and passing backwards to the pineal body." On p. 722 he writes: "The base of the pineal body is attached by a short stalk to a transverse white band or frænulum above the posterior commissure. . . . The pineal body is a rudiment of a median parietal eye, which probably at one time in ontogeny reached the surface. It is proportionally much larger in the fetus than in the adult."

³⁵⁶ **Fastigium* (Ibid.).—This name is given by the author to the angular recess in the roof of the fourth ventricle, between the valve of Vieussens (superior medullary velum) and the inferior medullary velum. The apex of the recess is directed towards the medullary centre of the worm, and in that centre, adjacent to the fastigium on either side of the middle line, is a small collection of grey matter known as the *nucleus of the roof* or *nucleus fastigii*, one of the nuclei of the white matter of the cerebellum (see Fig. 1187, p. 772, and Fig. 1188, p. 773). Although the term *nucleus fastigii* is used both by Quain and Macalister, neither of these authorities employs the term *fastigium*. Quain speaks of it as the *tent of the fourth ventricle*.

³⁵⁷ *Gyrus Rectus* (Fig. 1174, p. 765).—This name, or its English equivalent *straight gyrus*, is sometimes given to the inner part of the *inner orbital gyrus*, between the olfactory sulcus and the mesial border of the orbital surface of the frontal lobe.

³⁵⁸ *Middle or Grey Root of the Olfactory Tract* (Ibid.).—According to Quain (*op. cit.*, vol. iii., part 1, p. 159), "the *olfactory tract* . . . bifurcates posteriorly into two roots, *mesial* and *lateral*, which diverge as they pass backwards and enclose . . . a space, the *trigonom olfactorium*, which is also known as the *middle* or *grey root of the tract*." The term *stria olfactoria intermedia*, used by Toldt to denote the *middle* or *grey root of the olfactory tract*, is, however, distinguished by him from the *trigonom olfactorium* (see Fig. 1174, p. 765). "It is very short and often very ill-defined; and it passes directly backwards to the anterior perforated lamina" (Von Langer and Toldt, *op. cit.*, p. 639). The middle root, in fact, occupies the central portion of the trigonom olfactorium.

³⁵⁹ *Isthmus Rhombencephali*, etc. (Fig. 1175, p. 766).—I quote from Von Langer and Toldt's "Anatomy" (pp. 618, 619) the following passage, in order to throw light on certain differences between the author's nomenclature and that usual in England. (The significance of the term *rhombencephalon* has already been explained in note ³⁵⁵ above.) "The *isthmus rhombencephali* constitutes the uppermost, most constricted portion of the rhombencephalon, serving to connect it with the mid-brain and the cerebrum." The dorsal surface of this isthmus, consisting of the *brachia conjunctiva* (superior peduncles of the cerebellum, *crura cerebelli ad cerebrum*), with the *velum medullare anterius* (superior medullary velum, or valve of Vieussens) between them, and the *frænulum veli* which passes forwards from the velum to the *sulcus longitudinalis seu sagittalis* of the quadrigeminal lamina, are then described, and the authors proceed: "On the lateral surface of the isthmus we observe a circumscribed triangular area, which exhibits a fasciculus of fibres passing on each side from the interior of the cerebral peduncle, then bending upwards on the outer surface of the superior peduncle of the cerebellum to reach the quadrigeminal lamina. This is the *trigonom lemnisci*. The triangle is separated below from the *crus cerebri* by a well-marked furrow, the *sulcus lateralis mesencephali*; it is bounded in front by the lower (or posterior) brachium of the quadrigeminal bodies; behind it is separated from the outer margin of the superior peduncle of the cerebellum by a shallow groove passing obliquely backwards and downwards towards the pons Varolii. The fasciculus of fibres which comes to the surface in the triangle just described is known as the *fillet* or *lemniscus*. The *basal surface* of the *isthmus rhombencephali* consists of the parts forming the floor of the upper end of the fourth ventricle." The above fully explains the author's use of the term *isthmus rhombencephali* (Fig. 1161, p. 760, and Fig. 1162, p. 761); embryologically this corresponds to the *isthmus of His*, the constriction between the third and fourth cerebral vesicles (Quain, *op. cit.*, vol. i., part i., p. 67). The term *isthmus cephalis* is used by Quain in a different sense to denote the mid-brain itself (*op. cit.*, vol. iii., part i., p. 38). As regards the *trigonom lemnisci* (*triangle of the fillet), this term is not used by Quain or Macalister, though the area in question is minutely described by the former authority. The fillet, he writes (*op. cit.*, vol. iii., part i., p. 103), "is seen on the surface as a band of obliquely curved fibres, occupying a triangular area at the side of the tegmentum, and it was to this band that the name of *fillet* was originally applied by Reil. It is now known as the *lower* or *lateral fillet*." The *sulcus lateralis mesencephali* is known in England either by that name or by its English equivalent of *lateral groove*; it indicates the outer limit of the crista of the cerebral peduncle and the line along which the substantia nigra comes to the surface on the outer side, just as the *oculomotor groove* indicates the inner limit of the crista (marking it off from the posterior perforated space) and the line along which the substantia nigra comes to the surface on the inner side.

³⁶⁰ **Tenia Chorioidea* (Fig. 1176, p. 767).—This name is given by the author to the line of attachment of the outer layer of the choroid plexus of the lateral ventricle, here running parallel with and adjacent to the *stria terminalis* or *tenia semicircularis*. See note ¹ to p. 784, and note ³⁶² below.—It will be noted that in the official German nomenclature the term *chorioidea* retain a syllable that has been lost in the English equivalent *choroid*. The former spelling is etymologically more correct, the words being derived from the Greek *χόριον*, a membrane.

³⁷¹ (Ibid.) *Middle of the upper or dorsal portion of the pedun-*

culus conarii or *habenula* (Quain), or *transverse frantum of the pineal body* (Macalister). See note ³⁶⁰ above.

³⁷³ (Ibid.) The superior or anterior pair of corpora quadrigemina or optic lobes were termed *nates* by Vesalius, the inferior or posterior pair being called *testes*, but these names are now rarely used.

³⁷³ (Ibid.) These apertures in the epithelial roof of the lateral recess of the fourth ventricle are described by Quain, who does not, however, give them any distinctive name; Macalister calls them the *foramina of Key* and *Retzius* or *foramina of Mierzejewsky*.

³⁷⁴ (Fig. 1177, p. 767.) "The epithelial layer of the roof of the ventricle follows all the convolutions of the choroid plexuses, but is nowhere pierced by them; it is generally described as the *epithelium of the plexuses*" (Quain, *op. cit.*, vol. iii., part i., p. 50).

³⁷⁵ *Stratum Nucleare* (Ibid.).—This term is not used by Quain or Macalister, nor even is it to be found in Von Langer and Toldt's "Anatomy." Apparently it denotes the tract of grey matter in which the nuclei of the lower cranial nerves are situated, this tract being in the situation indicated in Fig. 1177.

³⁷⁶ *Funiculus Teres* and **Facial Eminence* (*Eminentia Teres*) (Figs. 1178, 1179, p. 768).—On either side of the median groove in the floor of the fourth ventricle is an eminence, called by Toldt *eminentia medialis*, extending from one extremity of the ventricle to the other. In England it is variously known as the *funiculus teres*, *fasciculus teres*, and *eminentia teres*. "In the upper half of the floor of the ventricle there may be seen, on the inner side of the superior fovea, a rounded elevation of the fasciculus teres, produced by the nucleus of the sixth nerve, with the deep part of the facial arching round it" (Ellis, "Demonstrations of Anatomy," 10th ed., p. 234). "Just above the auditory strize, the *eminentia medialis* widens out to form a flattened tubercle, characterized also by a somewhat lighter colour than the surrounding portion of the floor of the ventricle; owing to its relation to the root bundles of the facial nerve, this tubercle is called the *facial eminence* (**colliculus facialis*)" (Von Langer and Toldt, *op. cit.*, p. 620). Thus, while Ellis gives no name at all to the eminence under consideration, Von Langer and Toldt give one that can hardly be considered appropriate; for, though it is true that the inner genu of the facial nerve gives rise to its projection, it is not the *facial* but the *abducent nucleus* that lies beneath it, and the name of *facial eminence* is not in harmony with the names *auditory tubercle*, *trigonum hypoglossi*, etc., given to other parts of the floor of the fourth ventricle. I would suggest, therefore, that the name of *eminentia teres* should no longer be used as a synonym for the *funiculus* or *fasciculus teres*, but should be reserved to denote that part only of the latter beneath which lies the nucleus of the sixth nerve and the inner genu of the facial nerve. Thus, *eminentia teres* would be the English equivalent of the *colliculus facialis* of the Continental nomenclature. In the last edition of Quain's "Anatomy" the term is used with this significance: "Between the superior fovea and the median sulcus is the prolongation of the funiculus teres, which is prominent (*eminentia teres*) opposite the fovea, but becomes gradually less so above and below" (*op. cit.*, vol. iii., part i., pp. 50, 51).

³⁷⁷ **Limiting Sulci* (Fig. 1179, p. 768).—Concerning the limiting sulci in general, Von Langer and Toldt write as follows (*op. cit.*, pp. 602, 603): "In addition to the longitudinal segmentation of the brain by means of transverse furrows . . . we recognise in the embryonic brain also a *ventral* and *dorsal* segmentation. The boundaries between the ventral and dorsal segments consist of right and left lateral longitudinal furrows, the *sulci limitantes*, which extend through all the six principal subdivisions of the

brain, and are still clearly recognisable in the adult brain. The significance of this ventrodorsal segmentation lies in the fact that from the respective ventral and dorsal portions of the individual secondary cerebral vesicles quite distinct portions of the brain are developed; and in particular it is to be noticed that in the ventral segments the nuclei of origin of all the motor cranial nerves arise—in the dorsal segments, on the other hand, the nuclei of origin of all the sensory cranial nerves. In this fact we find an important homology between the brain and the spinal cord." As regards the **limiting sulci of the floor of the fourth ventricle* in particular (see Fig. 1179, p. 758, and Fig. 1210, p. 787), the same authors write (*op. cit.*, p. 621): "We must also mention the *sulci limitantes fossae rhomboideae*; these are two longitudinally disposed **limiting sulci* which separate the parts developed from the ventral portion of the embryonic **rhombencephalon* (see note ³⁶⁰ above) from the parts developed from the dorsal portion of the same. Passing upwards from the calamus scriptorius, the limiting groove lies on either side between the trigonum hypoglossi and the ala cinerea; above this the **limiting sulcus* is represented by the inferior fovea, and it proceeds thence upwards along the inner border of the trigonum acustici or auditory triangle, its course being somewhat curved, with the concavity towards the median line, to pass into the superior fovea; thence upwards it extends along the outer border of the *eminentia teres* as far as the aqueduct of Sylvius." The *sulcus of Monro*, *sulcus hypothalamicus Monroi* (see Fig. 1173, p. 764, and note ³⁶⁹ above), is another sulcus of this group, being given by Von Langer and Toldt the alternative name of *sulcus limitans ventriculi tertii*.

³⁷⁸ **Nucleus of the Optic Nerve* (Fig. 1180, p. 769).—This term is not used by Quain or Macalister. The author here applies it to the *grey matter of the external geniculate body*, and Von Langer and Toldt write (*op. cit.*, p. 648): "The light-perceiving fibres of the optic nerve for the most part pass into the external geniculate body, and in part also into the upper quadrigeminal body. The grey nuclei of these bodies are therefore to be regarded as the *nuclei of the optic nerve*." The appropriateness of the term must, however, be questioned, in the light of the most recent observations. Gowers writes on this point ("Diseases of the Nervous System," and ed., vol. ii., p. 54): "Of these intermediate stations [between the fibres of the optic tract and the grey matter of the hemisphere], the external corpus geniculatum has been commonly regarded as that which is of chief importance in connexion with the visual fibres, since its atrophy has been frequently observed in cases of long-standing atrophy of the tract. But many recent observations establish the fact that disease limited to the posterior extremity of the optic thalamus may cause hemianopia, and it seems doubtful whether the symptom is caused by disease of the external geniculate body. Hence we must regard the pulvinar as the intermediate visual centre, and the precise function of the corpus geniculatum becomes again mysterious."

³⁷⁹ The *motor nucleus of the glossopharyngeal and pneumogastric nerves* (Fig. 1181) is otherwise known as the *nucleus ambiguus*, or *accessory or efferent vagoglossopharyngeal nucleus* (Fig. 1180). From this nucleus arise the fibres that make up what the author calls the *motor root* of the pneumogastric nerve, the *sensory root* arising from the *principal nucleus* of the same nerves or *nucleus of the ala cinerea*; finally, the *funiculus solitarius* supplies a *spinal root* to the pneumogastric nerve.

³⁸⁰ *Nomenclature of the Parts of the Cerebellum* (Figs. 1182, 1183, p. 770).—Quain's description of the cerebellum is so much fuller and more minute than that of Von Langer and Toldt, that it has

been impossible, in Figs. 1182 to 1189, to incorporate the whole of Quain's terminology (as I have endeavoured to do throughout this English edition of Toldt's Atlas) and in the text of these figures I have for the most part been content to give the established English renderings of the Latin names used in the original. As heretofore, however, Quain's terminology has remained the standard, though a portion only of that author's description is represented in these figures. The three principal omissions in Von Langer and Toldt's description of the cerebellum are: (a) that the fissures and sulci, with the exception of the *great horizontal fissure* and the *transverse fissure* (see note ³³⁵ below) are left unnamed; (b) that while the worm and the hemispheres respectively are divided into segments in the usual manner, the names used by Quain for the *lobes*, each consisting of a segment of the worm together with the parts of the hemispheres specially related to that segment, are not given by the German author; and (c) that the *slender lobe* (*lobus gracilis*) of the under surface of the hemispheres is entirely omitted from Toldt's description. As far as can be judged from Figs. 1183 and 1185, the *anterior part of the slender lobe* (*lobus gracilis anterior*) constitutes the hinder portion of the *lobus biventralis* of the author; while the *posterior part of the slender lobe* (*lobus gracilis posterior*) constitutes the anterior portion of the *lobus semilunaris inferior* of the author.

³³¹ *Quadrilateral Lobe* (Fig. 1182, p. 770).—According to Quain (*op. cit.*, vol. iii., part i., p. 74), "The combined anterior and posterior crescentic lobes of each hemisphere were formerly termed the *quadrilateral lobe*." In Ellis's "Demonstrations of Anatomy" this lobe is called the *anterior* or *quadrate lobe*. Macalister terms its subdivisions the *anterior* and *posterior lunated lobules*. Kölliker called them *lobus lunatus anterior* et *posterior*.

³³² *Central Lobe and Central Lobule* (*Ibid.*).—It would be better to use the name *central lobule* to denote the part of the worm situated between the lingua and the culmen, and to reserve the name *central lobe* for the lobule and its two *alae* considered as a whole. See also note ³⁸⁰ above.

³³³ *Transverse Fissure of the Cerebellum* (Fig. 1184, p. 771).—"The grey cortex of the cerebellum, considered as a whole, has the form of a shell, open in front, and receiving into its interior, by means of this anterior, transversely-disposed opening (*fissura transversa cerebelli*), the three pairs of cerebellar peduncles" (Von Langer and Toldt, *op. cit.*, p. 615). This so-called *transverse fissure* is, however, simply the anterior part of the *great horizontal fissure*, which, to quote Macalister (*op. cit.*, p. 727), "widens towards the pons, where it receives the *crus [crua] cerebelli*."

³³⁴ *Capsule of the Dentate Nucleus* (Fig. 1187, p. 772).—According to Quain (*op. cit.*, vol. iii., part i., p. 83), "The dentate nucleus may be described as consisting of a plicated pouch or capsule of grey substance, open at one part and enclosing white matter in its interior, like the dentate nucleus of the lower olivary body." Toldt, however, uses the word *capsule*, not to denote the corrugated grey lamella of the dentate nucleus, but in the sense explained in the following quotation (Von Langer and Toldt) *op. cit.*, p. 613: "The white medullary substance which immediately envelops the *nucleus dentatus* consists of thick medullated nerve fibres, which on all sides enter the grey lamella of the nucleus." These white fibres thus form a *capsule* for the dentate nucleus in the same sense in which the white matter adjacent to the lenticular nucleus of the corpus striatum forms the internal and the external capsule. Cf. also the fibres called by Stilling the *semicircular fibres*, which curve round the corpus dentatum in their passage from the inferior peduncle to the cortex of the cerebellar hemisphere. They are shown in a drawing after Stilling in Quain's "Anatomy," vol. iii., part i., p. 83, Fig. 60.

³³⁵ *Nucleus of the Olivary Body* (Figs. 1188, 1189, p. 773).—Toldt calls this *nucleus olivaris inferior*, and in England also it is sometimes distinguished as the *inferior olivary nucleus*. Most frequently, however, it is spoken of as the *olivary nucleus* without qualification, the *accessory olivary nuclei* (Fig. 1239, p. 786) and the *superior olivary nucleus* (Fig. 1211, p. 787) being always carefully distinguished by the use of the qualifying adjective. The nucleus of the lower olive is also known as the *corpus dentatum of the olive*.

³³⁶ *Sulci and Gyri of the Outer or Convex Surface of the Occipital Lobe* (Fig. 1192, p. 776).—These are more variable than those of the other lobes, and the matter is further complicated by divergencies in nomenclature, and by a want of agreement as to the anterior boundary of the occipital lobe on the outer or convex surface of the hemisphere. According to Von Langer and Toldt, "this boundary is constituted by a very variable vertically disposed furrow, the *sulcus occipitalis anterior*." This sulcus is not described by Quain, but, as far as can be judged from Fig. 1192 of Toldt's Atlas, it must be regarded as an aberrant, detached, and unusually profound portion of the *anterior occipital sulcus* of Quain, which Toldt (following Ecker) calls the *transverse occipital sulcus*. As regards the gyri of the occipital lobe, the old description of three *occipital gyri*—*superior*, *middle*, and *inferior*—has for the most part been abandoned. Toldt describes *superior occipital gyri*, above the *transverse occipital sulcus*, continuous with the *cuneus* of the mesial surface; and *lateral occipital gyri*, below that sulcus, "uniting posteriorly to form the *occipital pole* of the hemisphere" (see Fig. 1194, p. 777). Quain divides the outer surface of the occipital lobe into an *anterior occipital gyrus*, "between the anterior occipital sulcus (transverse occipital sulcus of Toldt) and the upturned end of the lateral occipital sulcus," and a *posterior occipital gyrus* "behind the upturned end of the lateral occipital sulcus." Owing to these manifold discrepancies, I have in the text been content to give a literal English translation of the Latin names used by Toldt to denote the sulci and gyri of the outer surface of the occipital lobe.

³³⁷ *Rostral Lamina* (Fig. 1193, p. 776).—"The *lamina rostralis* is a lamella of the thickness of a sheet of notepaper, directly continuous with the rostrum of the corpus callosum, which curves downwards, concave anteriorly, to the anterior commissure, envelops that structure, and below it is continued as the *lamina cinerea*; on either side the rostral lamina is directly continuous with the subcallosal gyri or peduncles of the corpus callosum, thus appearing to constitute a commissural layer between the latter" (Von Langer and Toldt, *op. cit.*, p. 641). "The rostrum of the corpus callosum becomes gradually narrower as it descends, and is connected with the lamina cinerea by a thin white layer, the *commissura basos alba* of Henle" (Quain, *op. cit.*, vol. iii., part i., p. 128).

³³⁸ *First or Superior Frontal Gyrus, Marginal Gyrus, and Paracentral or Oval Lobule* (Figs. 1194, 1195, p. 777).—The *first or superior frontal gyrus* consists of two portions—an *outer*, smaller, on the outer or convex surface, and an *inner*, larger, on the inner or mesial surface of the frontal lobe; these are continuous over the upper mesial border of the hemisphere. The *outer* part is bounded above by the border just named, and below by the superior frontal sulcus; to this part alone the name of *first frontal convolution* is in England often restricted. The *inner* part, commonly known in England as the *marginal gyrus*, is bounded above by the upper mesial border of the hemisphere, and below and behind by the callosomarginal fissure. The marginal gyrus, again, is divided into two portions by the *anterior ascending ramus of the paracentral fissure*. The anterior and much larger portion

is that denoted by the author in Fig. 1195 as the *gyrus frontalis superior*. The posterior extremity of the marginal gyrus, separated from the rest by the above-mentioned sulcus, is known as the *paracentral* or *oval lobule*. This lobule is continuous with the two central gyri on either side of the upper extremity of the fissure of Rolando.

³⁸⁹ **Triangular Recess (of the Third Ventricle)* (Fig. 1200, p. 782).—This name is not used by Quain or Macalister. Von Langer and Toldt describe the recess in the following terms (*op. cit.*, pp. 632, 633): "Above the lamina cinerea, the anterior pillars of the fornix (columnae fornicis) constitute the anterior wall of the third ventricle. Since these pillars converge as they ascend, there exists between them a triangular fossa, the **recessus triangularis*, which is closed in front by the attachment of the septum lucidum to the front of the anterior pillars of the fornix. At the base of the **triangular recess* we see the middle of the anterior commissure." (The **triangular recess* is well shown in Fig. 1220, p. 792, and in Fig. 1224, p. 795.)

³⁹⁰ *Gyrus Fornicatus* and *Sulcus Cinguli* (Fig. 1201, p. 783).—The terms *gyrus fornicatus*, *gyrus cinguli*, and *callosal gyrus* are used by Quain as synonymous, to denote the convolution marked *gyrus cinguli* in Fig. 1201, p. 783. Toldt, however, employs the term *gyrus fornicatus* in a more extended sense, as a general name for the *gyrus cinguli* and *gyrus hippocampi* considered as a whole (the *grand lobe limbique* of Broca). The *gyrus cinguli* is bounded above by the *sulcus cinguli*, the *callosomarginal fissure* of English authors (see Fig. 1195, p. 777); and this is divided by Toldt into a *pars marginalis* and a *pars subfrontalis*, *marginal* and *subfrontal* portions, the terms being self-explanatory. The posterior portion of this sulcus was called by Wilder the *paracentral fissure*; the anterior portion, which is parallel with the genu of the corpus callosum, the *prelimbic fissure*.

³⁹¹ **Free Portion* and **Covered Portion of the Anterior Pillar of the Fornix* (Ibid.).—The anterior pillars of the fornix, or columnae fornicis, are rooted below in the corpora albicantia seu mammillaria, from which they pass obliquely upwards, forwards, and inwards through the grey matter of the "hypothalamus [see note ³⁸⁴ above], emerging therefrom in front of the anterior extremity of the optic thalamus. We thus distinguish two portions in each anterior pillar of the fornix, viz.: an inferior portion, the **pars tecta columnae fornicis*, which is bidden in the substance of the lateral wall of the third ventricle; and a superior portion, the **pars libera columnae fornicis*, which ascends free in front of the optic thalamus" (Von Langer and Toldt, *op. cit.*, pp. 642, 643). Between the free portions of the two pillars is situate the **triangular recess* (see note ³⁸⁹ above); and they form the anterior boundary of the foramen of Monro, which is situate between the columnae fornicis and the anterior extremities of the optic thalamus.

³⁹² *The Use of the Term "Tenia"* (Figs. 1202, 1203, p. 784).—Von Langer and Toldt use the term *tenia* in a more precise and restricted sense than that in which it is used by Quain, and it seems expedient to give a brief account of the significance attached to this term by these respective authorities in all cases in which they use it in describing the anatomy of the brain. One instance, in which Quain and Toldt use the term in exactly the same sense, may be first dismissed; this is to denote the *tenia ventriculi quarti*, the *tenia (of the fourth ventricle)*, often, however, called the *lingula* by English anatomists—see Fig. 1177, p. 767, Fig. 1178, p. 768, and Fig. 1188, p. 773 (Macalister denotes the lower part of the *tenia* or *lingula* by the name *ponticulus*, a name applied by Quain to a quite different structure, viz., a band of arched fibres often seen crossing the upper end of the

pyramid of the medulla oblongata). The other *tenia* described by Toldt—*tenia chorioidea*, *tenia fimbria*, *tenia fornicis*, and *tenia thalami*, all classed together as *tenia telarii*—are the lines of attachment of the velum interpositum and its associated choroid plexuses, along which lines the *lamina chorioidea epithelialis*, i.e., the epithelial coat of these structures, becomes continuous with the epithelial covering of the ependyma of the ventricles. Thus, the *tenia thalami* is the line of attachment on either side of the lower surface of the velum interpositum, this line extending forwards from the pineal body and its peduncle along the *stria medullaris thalami* (*pineal stria* of English authors, also known in England as the *tenia fornicis*—see below, and note ³⁸⁹ above) to the foramen of Monro, where the *tenia thalami* passes into the *tenia chorioidea*. From the foramen of Monro, the inner layer of the attachment of the choroid plexus of the lateral ventricle passes (1) along the outer free margin of the fornix, where it forms the *tenia fornicis*, and is continued (2) as the *tenia fimbria* along the outer margin of the *fimbria hippocampi* (see below) to the end of the inferior or descending horn of the lateral ventricle, where this layer also becomes continuous with the *tenia chorioidea*. This last, the outer layer of the attachment of the choroid plexus of the lateral ventricle, "runs along the border of a thin layer which proceeds from the tail of the caudate nucleus as a portion of the wall of the vesicle of the cerebral hemisphere in which no medulla has formed, and is attached to the optic thalamus along the upper surface of the *vena terminalis* (vein of the corpus striatum), hence called the *lamina affixa* [see below]. At the foramen of Monro, as already remarked, the *tenia chorioidea* is continuous with the *tenia thalami*" (*op. cit.*, p. 644). It will be seen that Toldt's use of the term *tenia* has the greater merit of consistency.—As regards the *tenia* of English authors: (1) the *tenia fornicis*, as already explained, is a synonym for the *pineal stria*, called by Toldt *stria medullaris thalami*, and is the line of attachment of the choroid plexus of the third ventricle (called by Toldt *tenia thalami*); (2) the *tenia hippocampi* or *fimbria* (*fimbria hippocampi* of Toldt) is the downward prolongation, in the inferior or descending horn of the lateral ventricle, of the posterior pillar of the fornix, and is itself prolonged anteriorly into the white matter of the uncus (this structure is called by Macalister the *corpus fimbriatum*; its inner margin appears on the surface of the limbic lobe, above the dentate convolution or fascia dentata Tarini, from which it is separated by the fimbriodentate sulcus—see Fig. 1201, p. 783); to the ventricular margin of the fimbria the choroid plexus of the lateral ventricle is attached by means of (3) the *tenia fimbria*, a term used by Quain (*op. cit.*, vol. iii., part i., p. 158) in the same sense as that in which it is used by Toldt; (4) the *tenia semicircularis*, called by Toldt *stria terminalis*, a name very commonly used also by English anatomists, is the white stria separating the dorsal surface of the optic thalamus from the caudate nucleus of the corpus striatum: it is adjacent to the line of attachment of part of the *tenia chorioidea* of Toldt, and along it runs the *vein of the corpus striatum* (*vena terminalis* of Toldt): "Close to the ependyma and lying over this vein of the corpus striatum is a small greyish band, containing longitudinally running nerve fibres: this has been called the *lamina cornua*" (Quain, *op. cit.*, vol. iii., part i., p. 122)—the *lamina cornua* of Quain is the *lamina affixa* of Toldt; (5) the *tenia pontis* (*fila lateralis pontis* of Toldt) is figured on p. 766, and described in note ² on that page; (6) finally, the name of *tenia tecta* (*stria obliqua*, Macalister) is sometimes given to the grey or lateral longitudinal stria on the upper or dorsal surface of the corpus callosum—(see Fig. 1198, p. 780). The *tenia*

telarum of the author are shown in the figures on p. 784 and p. 785.

³⁰³ *External or Superficial Arched or Arcuate Fibres* (Fig. 1208, p. 786).—These are divided by Von Langer and Toldt into two groups—*anterior* and *posterior*. The former group consist of the fibres usually spoken of in England as the *outer or superficial arched fibres* without further qualification, which emerge from the anterior median fissure, and pass backwards over the pyramid and olive to join the restiform body. According to Quain, they decussate in the raphe of the medulla oblongata, "but their further course is not certainly known." Von Langer and Toldt state that they arise from the nuclei of the funiculus gracilis and the funiculus cuneatus. "The *posterior external arched fibres* pass directly from the nuclei of the funiculus gracilis and the funiculus cuneatus to the surface of the restiform body of the same side" (*op. cit.*, p. 614). These *posterior arched fibres* are not mentioned by Quain.

³⁰⁴ *Decussation of the Fillet* (Figs. 1208, 1209, p. 786).—This decussation has received very various names. "Rather unfortunately," as Gowers says, it has been called the *superior pyramidal decussation*; less objectionable is the shorter name, *superior decussation*; but this is not sufficiently distinctive. Macalister calls it the *sensory pyramid crossing*, in which the misleading analogy with the pyramids is once more alluded to. The name *sensory decussation*, also, is in common use. But the name used in the text, *decussation of the fillet*, the English equivalent of the Continental *decussatio lemniscorum*, is greatly to be preferred.

³⁰⁵ *Cerebello-olivary Fibres* (Fig. 1210, p. 787).—At the end of their description of the medulla oblongata, Von Langer and Toldt describe the above-named fibres in the following terms (*op. cit.*, p. 614): "Finally, we must mention a tract of fibres of considerable size, which does not appear on the surface of the medulla, but forms an important constituent of the restiform bodies. This tract takes origin in the nerve cells of the inferior olivary nucleus, traverses the white centre of that nucleus, and emerges at its hilum; it then crosses the median plane, and enters the opposite olivary nucleus. After passing through this latter, it passes upwards and backwards into the restiform body, and thus to the cerebellum. The tract in question is known as the '*fibre cerebello-olivares*.' This name is not used by Quain, but the fibres are described by that author in his account of the *nucleus of the olivary body*. 'The open part of the hilum of this nucleus,' he writes (*op. cit.*, vol. iii., part i., p. 56), 'looks towards the middle line and receives a considerable tract of white fibres, which emanate from the raphe, being derived to all appearance from the opposite olive, and pass into the hilum along its whole extent, forming the so-called *olivary peduncle*. The fibres of the olivary peduncle are partly lost in the grey matter of the olivary nucleus, but mostly pass in small bundles through the lamina, those which are more posterior turning backwards and coursing obliquely through the posterior part of the lateral area to join the restiform body and thus to pass to the cerebellum as internal arched fibres. Others after coursing through the grey lamina . . . reach the surface . . . and are continued as part of the layer of external arched fibres into the restiform body. Through the restiform body, the arched fibres, and the fibres of the olivary peduncles, the cerebellar hemisphere of one side is connected, therefore, with the olivary nuclei of both sides. But the connection with the opposite side is the more intimate.'"

³⁰⁶ *Pyramidal Nucleus* (Fig. 1210, p. 787).—"In the region of the pyramids, small deposits of grey matter are also met with,

the **pyramidal nuclei*, **nuclei pyramidis*, the number and location of which is not constant; most frequently they are met with toward the posterior part of the pyramid, near the olivary nucleus" (Von Langer and Toldt, *op. cit.*, p. 613). It must be noticed that the **pyramidal nucleus* depicted in Fig. 1210 is a distinct grey nucleus from the *internal accessory olivary nucleus* shown in Figs. 1208, 1209, which latter is sometimes called the *pyramidal nucleus* by English authors.

³⁰⁷ *Crustal Bundle of the Fillet* (Figs. 1212, 1213, p. 788).—It is to be regretted that neither Toldt nor Quain gives any distinctive name to this fasciculus. The latter authority describes it in the following terms (*op. cit.*, vol. iii., part i., p. 103): "The fibres of the mesial fillet nearest to the middle line separate themselves from the rest, and pass at the lower part of the mesencephalon into the crista, where they form a mesial bundle (Wernicke), which is traceable up into the subthalamic region, where it joins the *ansa lenticularis*." This bundle contains, according to Spitzka, the afferent cerebral tracts of the cranial nerves (*op. cit.*, p. 101). Gowers describes this fasciculus still more briefly: "One small bundle of fibres in the inner part of the crista differs from the rest. As it descends it passes backwards into the tegmentum and joins the fillet. Its further relations have not been traced" ("Diseases of the Nervous System," 2nd ed., 1893, vol. ii., p. 32). I would suggest the adoption of the name **crustal bundle of the fillet* (see Figs. 1212, 1213, and 1225).

³⁰⁸ **Nucleus of the Lateral Fillet* (Fig. 1213, p. 788).—The name *nucleus lemnisci lateralis* occurs in two different figures of this work, viz., in the section of the mid-brain depicted in Fig. 1213, p. 788, and in the diagram of the tract of the fillet in Fig. 1225, p. 796. In Von Langer and Toldt's "Anatomy" (p. 657), the connexions of the *lemniscus lateralis* (*acusticus*)—the *lower or lateral fillet*—are thus described: "It arises for the most part from the trapezium, but in addition from the *nucleus of the fillet* [*Schleifenkern*—no Latin equivalent is given] situate posterior to the external or **dorsal accessory olivary nucleus*, and further is reinforced by fibres from the auditory striæ of the auditory triangle of the opposite side. The indirect continuation of this tract passes through the lower brachium of the quadrigeminal bodies to the internal corpus geniculatum, and thence to the cortex of the temporal lobe (*central tract of the auditory nerve*)." The **nucleus lemnisci lateralis* shown in Fig. 1213 is altogether too remote from the accessory olivary nuclei for its identification with the *nucleus of the fillet* described in the above quotation. In Fig. 1225, on the other hand, the *nucleus lemniscus lateralis* is figured more than half an inch below the inferior quadrigeminal body, beneath which it appears in the section depicted in Fig. 1213; and yet it is still a considerable way above the level of the accessory olivary nuclei. The connexions of the lower end of the lateral fillet, as shown in Fig. 1225, with the trapezium, the auditory striæ (through the upper olivary nucleus), and with the "nucleus lemnisci lateralis," lead us in this case, however, to identify the latter with the *nucleus of the fillet* mentioned in the quotation from Von Langer and Toldt's "Anatomy." The fact that Fig. 1225 is diagrammatic will not suffice to account for the discrepancy between Figs. 1213 and 1225, and it seems probable that the *nucleus lemnisci lateralis* of the former figure is an *upper nucleus* of the lateral fillet, an outlying portion of the nucleus of the lower quadrigeminal body; while the *nucleus lemnisci lateralis* of Fig. 1225 is a *lower nucleus* of the lateral fillet, viz., the medullary nucleus before mentioned adjacent to the external accessory olivary nucleus. Quain (*op. cit.*, vol. iii., part i., p. 104) states that according to Edinger some of the fibres of the fillet

"have a cell-station in a special group of nerve cells (upper nucleus of the fillet) at the level of the inferior corpora quadrigemina." Gowers, again (*op. cit.*, vol. ii., p. 36), writing of the different sets of fibres of the fillet, says: "Some fibres go to the posterior corpus quadrigeminum. . . . Others end in a collection of grey matter lying outside the junction of the two corpora quadrigemina, the *nucleus lemnisci* of Flechsig and Bechterew." The identification of Edinger's upper nucleus of the fillet with Flechsig and Bechterew's *nucleus lemnisci*, and the identification of both with the *nucleus lemnisci lateralis* of Fig. 1213 in Toldt's Atlas seems plausible; but the descriptions of Quain and of Gowers are too brief to allow of any certainty in the matter.

³⁸⁹ *Tegmental Decussation* (Fig. 1214, p. 789).—This term (*decussatio tegmentorum* in the author's nomenclature) is by some writers on anatomy used to denote the decussation of all fibres that cross the median plane within the boundaries of the tegmentum. In this work, however, the decussation of the *brachia conjunctiva* or *superior peduncles of the cerebellum* (*decussatio brachii conjunctivi* in the author's nomenclature—see Fig. 1172, p. 764, Fig. 1187, p. 772, Fig. 1213, p. 788, and Fig. 1226, p. 797) is not included in the *tegmental decussation*, the latter term denoting the decussation of those tegmental fibres only which do not belong to the superior peduncles of the cerebellum.

⁴⁰⁰ *Strata of the Upper or Anterior Quadrigeminal Bodies* (Fig. 1214, p. 789).—According to Quain's account of the structure of these bodies (*op. cit.*, vol. iii., part i., pp. 106, 107): "Most externally or uppermost is a thin layer of superficial neuroglia, containing no nerve cells or fibres. . . . Excluding this neuroglia layer, and also the central grey matter around the Sylvian aqueduct [*stratum griseum centrale* in Toldt's nomenclature], Tartuferi distinguishes four strata in vertical sections." These strata are: (1) *Stratum zonale*: superficial white layer. (2) *Stratum cinereum*: grey cap. (3) *Stratum albo-cinereum superius*: upper grey-white layer; or *stratum opticum*. (4) *Stratum albo-cinereum inferius*: deep grey-white layer; or *stratum lemnisci*. Von Langer and Toldt, on the other hand (*op. cit.*, p. 628), describe three layers only in this region: (1) *Stratum zonale*; (2) *stratum griseum colliculi superioris*; and (3) *stratum album profundum*. The first is certainly identical with the *stratum zonale* of Quain. The third, described as "a white lamella forming the lower boundary of the quadrigeminal layer," is shown by Fig. 1214 to be identical with the *stratum lemnisci* of Quain. The second would appear to comprise Quain's second and third layers—the *stratum cinereum* and the *stratum opticum*. The latter is the layer of fibres seen in Fig. 1214 arching outwards towards the inferior or posterior brachium. These fibres do not, however, pass into this brachium, but into the superior or anterior brachium, being continued through this body into the optic tract. Lines indicating the *optic layer* and the *layer of the fillet* have in this edition been added to Fig. 1214.

⁴⁰¹ *Radiation of the Corpus Striatum* (Fig. 1216, p. 790).—This term is not used by Quain. Von Langer and Toldt write (*op. cit.*, p. 655): "It must be mentioned as a fact of great importance, that the outer zone of the lenticular nucleus, as well as the corpus striatum [*i.e.*, the caudate nucleus—see note 1 to p. 766], must be regarded as functionally representing a portion of the cortex cerebri, not only in respect of its mode of origin, but also because the nerve fibres entering this nucleus terminate in its nerve cells. But if, nevertheless, from both these basal ganglia, radiating nerve fibres pass to the cortex of the frontal and parietal lobes, forming the *radiatio corporis striati*, these fibres may with great probability be regarded as *association fibres*, homologous

with those known to connect different regions of the cerebral cortex." In Ellis's "Demonstrations of Anatomy," 10th ed., p. 227, the fibres of the corona radiata are said to be of two kinds, viz., "those extending without interruption from the cortex to the isthmus cerebri, and those uniting the cortex with the corpus striatum and optic thalamus." The fibres of the corona radiata that unite the cortex with the corpus striatum constitute the **radiation of the corpus striatum* of Toldt. Gowers, on the other hand, writes ("Diseases of the Nervous System," 2nd ed., vol. ii., p. 41): "It is doubtful whether the corpus striatum has any connexion with the cortex, and the old hypothesis that its cells interrupt the fibres which conduct motor impulses seems to be altogether wrong. Meynert thought that many fibres pass from the caudate nucleus to the cortex; but the researches of Wernicke and others make this connexion very doubtful." It is, of course, the views of Meynert that are embodied in the above quotation from Von Langer and Toldt.

⁴⁰² *Subthalamic Tegmental Region* (Fig. 1219, p. 792).—This, the forward prolongation of the tegmentum beneath the posterior part of the optic thalamus, is the *stratum intermedium* of the Continental nomenclature, forming the principal portion of the *pars mamillaris hypothalami* of the same nomenclature (see Appendix, note ³⁸⁴). The German vernacular name for this part of the brain is *Zwischenschicht*, which corresponds roughly with the English *transitional region*, an alternative name for the somewhat cumbersome term *subthalamic tegmental region*. (It must be noted that Quain uses the term *stratum intermedium* in an entirely different sense, viz., to denote the deepest fibres of the crusta, those immediately adjacent to the substantia nigra.) The subthalamic tegmental region was divided by Forel into three layers. The uppermost, *stratum dorsale*, "consists chiefly of fine longitudinal fibres, prolonged from the posterior longitudinal bundle according to Meynert, or from the fibres enclosing the tegmental nucleus according to Forel, possibly from both sources. The red nucleus of the tegmentum is prolonged into its posterior part, and from this a considerable number of fibres stream into the internal medullary lamina of the thalamus, and a well-marked bundle passes across the internal capsule to the lenticular nucleus" (Quain, *op. cit.*, vol. iii., part i., p. 114). The name *stratum dorsale* is not used by Toldt, but the bundle of fibres last mentioned is shown in Fig. 1219, p. 792, as the "*fasciculus from the tegmental tract to the lenticular nucleus*" ("*Haubenbündel zum Linsenkern*"). The lowermost layer of the subthalamic tegmental region is formed by the *corpus subthalamicum*, or *nucleus of Luys* (*nucleus hypothalamicus*, vel *corpus Luysi*, according to Toldt—see Fig. 1219, p. 792). This "has here taken the place of the substantia nigra, lying next to the prolongation of the crusta, the fibres of which are seen at the side of the subthalamic tegmental region forming the internal capsule" (Quain, *op. cit.*, loc. cit.). The middle layer of this region, known as the *zona incerta*, "is a reticular formation prolonged from that of the tegmentum; it passes anteriorly into the substantia interansalis" (*op. cit.*, loc. cit.). This layer is ignored by Toldt.

⁴⁰³ **Grey Portion of the Hypothalamus* (Fig. 1220, p. 792).—There is no allusion to the "*pars grisea hypothalami*" in Von Langer and Toldt's "Anatomy," nor does Quain give any distinctive name to this portion of the brain. The latter author, however, alludes to it in the following terms (*op. cit.*, vol. iii., part i., p. 112): "The lower surface of the thalamus is continuous posteriorly with the prolongation of the tegmentum (*subthalamic tegmental region*), but in front this prolongation inclines to the outer side, and becomes lost in a layer of grey matter which is continuous internally with the grey matter of

the floor of the ventricle, and is seen at the base of the brain as the anterior perforated lamina." These connexions are well shown in Fig. 1220. Regarding the hypothalamus in general see Appendix, note ³⁵⁴, and regarding the subthalamic tegmental region see note ⁴⁰² above.

⁴⁰⁴ *Nomenclature of the Parts of the Internal Capsule* (Fig. 1223, p. 794).—"In horizontal sections the internal capsule shows a bend (*genu*) opposite the stria terminalis, the anterior third forming an angle of about 120° with the posterior two-thirds; these two parts are known as the *anterior* and *posterior segments* respectively" (Quain, *op. cit.*, vol. iii., part i., p. 136). In the official German nomenclature, the anterior segment is the *pars frontalis capsulae internae*; the posterior, *pars occipitalis capsulae internae*. In the German vernacular these are *vorderer Schenkel* and *hinterer Schenkel* respectively; and in England they are more often denoted by the equivalent terms *anterior limb* and *posterior limb*, respectively, than by the name *segment* used by Quain. As regards the *genu capsulae internae*, Gowers remarks (*op. cit.*, vol. ii., p. 27): "The angle at which the limbs of the capsule join is called its *elbow* or *knee*. . . . Such a bend (as in a pipe) is termed a 'knee' in Germany, an 'elbow' in this country. It is perhaps better to term the junction the *angle* of the capsule." The three parts of the capsule are seen as above described in Fig. 1223, p. 794.

⁴⁰⁵ *Tegmental Region and Tegmental Tract* (Fig. 1225, p. 796).—That the diagrammatic representation of the fibres of the tegmental system given in Figs. 1225 and 1226 may be more readily understood, I condense an account of this system from Von Langer and Toldt's "Anatomy," 10th ed., pp. 663-665. Those desiring a more detailed account both of the tegmental system and the pedal system (pyramidal tract, etc.) should refer to Foster's "Physiology," 6th ed., pp. 984-994: "The *tegmental tract* (*Haubenbahn*) is thus named because its fibres traverse the tegmentum of the cerebral peduncle. Its component parts have, however, a far wider range than this, comprising what is known as the *tegmental region* (*Haubengegend*). This region includes: (1) The parts bordering the calamus scriptorius (lower limit of the region); (2) the dorsal segment of the medulla oblongata; (3) the dorsal segment of the pons; (4) the tegmentum of the cerebral peduncle; (5) that part of the Interbrain known as the subthalamic tegmental region (*stratum intermedium* of Toldt—see note ⁴⁰² above—upper or anterior limit of the tegmental region); [we must add (6) what Gowers calls the *tegmental radiation*—i.e., the uppermost fibres of the sensory path as they radiate to the cortex from the hindmost third of the posterior limb of the internal capsule]. The most important structures forming the tegmental tract are: The nuclei of the slender and cuneate columns, the fillet, the formatio reticularis, the red nucleus, the nucleus of Lays, and the ansa lenticularis; but, since a portion of the tegmental tract traverses the cerebellum, we must include the restiform body, the dentate nucleus, and the superior peduncle of the cerebellum. The tegmental tract consists of two portions—a ventral and a dorsal. The *ventral portion* consists chiefly of the *tract of the fillet*, connected below with the nuclei of the slender and cuneate columns, passing above in part to the tegmental radiation already mentioned, in part to the corpora quadrigemina, the optic thalamus, and the globus pallidus; it also includes the *tegmental fasciculi of the posterior commissure*, which, after crossing in this commissure to the opposite side of the brain, join the mesial nucleus of the optic thalamus. The *dorsal portion* consists of fibres which arise in the nuclei of the slender and cuneate columns, pass as arched fibres to the restiform body, thence to the nucleus dentatus of the cerebellum,

and onwards from there into the superior peduncle of the cerebellum; with this peduncle the fibres of the tract decussate, pass through the red nucleus, and thence through the subthalamic tegmental region to their destination; a few of these fibres also pass into the internal capsule, but for the most part they terminate in the corpora quadrigemina, the optic thalamus, and the globus pallidus. See also note ⁴⁰⁶ below.

⁴⁰⁶ *Classification of the Fibres of the Cerebral Hemispheres* (Ibid.).—The fibres of the medullary centres of the hemispheres may be arranged in three principal groups. A. *Projection fibres* (*Leitungssystem*), which pass from the isthmus encephali to the hemispheres or *vice versa*; the most important divisions of these are: (1) the *pedal system* with the *pyramidal tract* (Fig. 1229), and (2) the *tegmental system* with the *tegmental tract* (Figs. 1225 and 1226; also see note ⁴⁰⁵ above). B. *Transverse or commissural fibres* (*Commissurensystem*), which connect the cortex of the two hemispheres; these comprise: (1) the *anterior commissure* (Fig. 1230, and note ⁴⁰⁸ below), the principal cerebral commissure in all vertebrates below mammals, and (2) the *corpus callosum* or *great commissure* (Fig. 1230), which appears first in the lower mammals, and is enlarged proportionately with the development of the mantle (see note ⁶ to p. 760). C. *Association fibres* (*Associationsystem*), which connect different parts of the cortex of the same hemisphere; these are: (1) *short association fibres* (*fibrae propriae*, Meynert; *laminae arcuatae gyrorum*, Arnold; *fibrae arcuatae cerebri*, Toldt—see Fig. 1231), which connect adjacent gyri, and (2) *long association fibres* (Fig. 1231), which connect more widely separated portions of the grey matter of the hemispheres. These latter fibres are mostly collected into definite bundles, the principal being the following: (a) The *superior association bundle* (*superior longitudinal fasciculus* or *bundle*; *fasciculus longitudinalis superior*, Toldt; *fasciculus arcuatus*, Burdach), sagittal fibres, passing from the frontal to the occipital and temporal lobes; (b) the *inferior association bundle* (*inferior longitudinal fasciculus* or *bundle*; *fasciculus longitudinalis inferior*, Toldt; *temporo-occipital bundle*), running along the outer wall of the posterior and descending horns of the lateral ventricle, and connecting the occipital and temporal lobes; (c) the *anterior association bundle* or *uncinate fasciculus* (*fasciculus uncinatus*, Toldt), which curves round the bottom of the Sylvian fissure near the limen insulae, and serves to connect the third frontal gyrus with the temporal lobe and the anterior part of the limbic lobe; (d) the *cingulum* (also known as the *fillet of the corpus callosum* and as the *covered band of Reil*), the principal association bundle of the gyrus fornicatus; its fibres terminate in the cortex of the outer surface of the hemisphere, where they connect with the hippocampal and callosal gyri (Beevor); (e) the *perpendicular fasciculus* (Wernicke—not mentioned by Toldt), which connects the inferior parietal lobule with the fusiform lobule; (f) the *fornix*, which connects the hippocampal region of the limbic lobe with the corpus albicans, and is commonly stated to be continued to the thalamus as the bundle of Vicq d'Azyr. The connexion between the fibres of the fornix and the bundle of Vicq d'Azyr is, however, denied by Gudden and Forel.

⁴⁰⁷ *Nucleus of the Third Nerve* (Fig. 1228, p. 799).—Quain divides the nucleus of the third nerve into parts in a manner considerably more elaborate than that shown by Toldt in Fig. 1228. I have, therefore, not attempted to harmonize the nomenclature of these two authors, but have merely given a literal translation of the terms used by Toldt.

⁴⁰⁸ *Parts of the Anterior Commissure* (Fig. 1230, p. 801).—By Von Langer and Toldt these are called simply *anterior* and *posterior* portions respectively. Quain, however, writes (*op. cit.*,

vol. iii., part i., p. 164): "The fibres of the anterior commissure which pass into the temporal lobe form by far the greater part of the commissure in man, and constitute what has been termed by Ganser the *pars temporalis*. Besides these fibres, there are others which are derived from the lobus olfactorius, and which appear to connect the olfactory tract of one side with the hippocampal gyrus of the opposite side. These form the *pars olfactoria* of Ganser; this part is very slightly developed in man." See also note ⁴⁰⁶ above.

⁴⁰⁹ *Reservoirs of Subarachnoid Fluid* (Fig. 1232, p. 802).—Quain uses Latin names for these, and gives no complete list of English equivalents; the English names in the text are, therefore, for the most part supplied by the translator. Quain enumerates the *cisternæ arachnoidales* as follows: Cisterna cerebellomedullaris (directly continuous with the subarachnoid space of the spinal cord), cisterna pontis media seu basilaris and cisternæ pontis laterales, cisterna interpeduncularis, cisternæ peripedunculares, cisterna chiasmatis (behind the optic chiasma), cisterna laminæ cineræ (in front of the chiasma), cisternæ fossæ Sylvii, and cisterna corporis callosi. Of these, the cisterna cerebellomedullaris, the cisterna interpeduncularis, and the cisterna chiasmatis are identical with those given the same name by Toldt; the cisterna pontis media seu basilaris of Quain is identical with the cisterna pontis of Toldt, while the cisternæ pontis laterales of Quain are not depicted by the German author, nor is the cisterna peripeduncularis visible in Fig. 1232, which represents a median sagittal section; the cisterna laminæ cineræ of Quain is merged in the cisterna fissuræ cerebri lateralis of Toldt, which for the rest is equivalent to the cisterna fossæ Sylvii of the English anatomist; the cisterna venæ cerebri magnæ of Toldt represents the posterior extremity of Quain's cisterna corporis callosi, the greater part of which, however, lying above the corpus callosum, is not indicated in Fig. 1232. "These spaces," writes Quain (*op. cit.*, vol. iii., part i., p. 188), "are all in free communication with one another, being only partly separated by imperfect septa of subarachnoid tissue. They receive the subarachnoid clefts (*fimbrina*) which follow the course of the great fissures (Rolandic, Sylvian, parallel, etc.), and which themselves receive the clefts which follow the course of the secondary and tertiary fissures (*rivi* and *rivoli* of Duret)."

⁴¹⁰ *Lateral and Sigmoid Sinuses* (Fig. 1233, p. 803).—In this work the denotation of the term *lateral sinus* is restricted to that portion of the *lateral sinus* of most English authors which is in contact with the occipital and parietal bones, the remaining, temporal, portion of the *lateral sinus* of English authors being here called the *sigmoid sinus*. This matter is more fully explained in the Appendix to Part V., note ²⁶⁴.

⁴¹¹ *Diaphragma Sellæ and Foramen Diaphragmatis Sellæ* (Fig. 1234, p. 804).—The layer of the dura mater which forms the roof of the pituitary fossa (see note ² to p. 60, in Part I.) has been somewhat variously named. Toldt's name, *diaphragma sellæ*, is sometimes used in England; the *foramen diaphragmatis sellæ* is the central aperture in the diaphragm through which the infundibulum passes to the pituitary body. According to Quain (*op. cit.*, vol. iii., part i., p. 182), "the portion of dura mater which stretches over the sella turcica, and, pierced by a small hole for the infundibulum, covers the pituitary body, is sometimes spoken of as the *operculum*, or *tentorium of the hypophysis*." According to Macalister (*op. cit.*, p. 530), the dura mater "forms a shelf-like *pituitary diaphragm* with a small central hole for the infundibulum." In this work I have chosen the names *pituitary diaphragm* and *orifice of the pituitary diaphragm* as the English equivalents of *diaphragma sellæ* and *foramen diaphragmatis sellæ*,

respectively (see Fig. 1234, p. 804, Figs. 1235 and 1236, p. 805, and Fig. 1239, p. 808).

⁴¹² **Notch of the Tentorium* (Figs. 1235, 1236, p. 805).—The somewhat inappropriate name of *superior occipital foramen* is applied by Macalister to what Toldt calls the *incisura tentorii*, viz., the aperture bounded behind and laterally by the free margin of the tentorium, through which the isthmus encephali passes with the basilar artery and the third and fourth cranial nerves. The *inferior occipital foramen* is better known as the *foramen magnum*.

⁴¹³ *Posterior Cutaneous Branches* (Fig. 1240, p. 810).—These are the cutaneous offsets of the posterior primary divisions of the spinal nerves, being the terminal portions of these nerves which reach the integument after passing through and supplying the muscles of the back. Fig. 1240 is diagrammatic, and it must not be supposed that as an actual fact from both the external and the internal branch of the posterior primary division of each dorsal nerve a posterior cutaneous branch is derived, giving external and internal offsets. According to Von Langer and Toldt (*op. cit.*, p. 678), "the *posterior cutaneous branches*, *rami cutanei dorsales*, proceed in the case of the posterior primary divisions of the upper dorsal nerves from the inner branches only, whereas in the case of the posterior primary divisions of the lower dorsal nerves the outer branches furnish the largest cutaneous offset." It must be observed that the terms *internal branch* and *external branch* (of the posterior primary division) are not, strictly speaking, the English equivalents of *ramus cutaneus dorsalis medialis* and *ramus cutaneus dorsalis lateralis*, respectively; but in Fig. 1240 the author has applied these Latin names to the *posterior cutaneous branches* before their emergence from the muscles, and in the case of the *ramus medialis* even before the origin of the muscular branch.

⁴¹⁴ *Intercostal Nerves* (*Ibid.*).—The upper six intercostal nerves, the distribution of which is confined to the parietes of the thorax, are sometimes distinguished as the *pectoral intercostal nerves*; the lower six, the anterior terminal branches of which supply the anterior wall of the abdomen, are similarly distinguished as the *abdominal intercostal nerves*. The twelfth nerve, being situated below the last rib, and therefore wholly contained in the abdominal wall, is for this reason sometimes called the *subcostal nerve*.

⁴¹⁵ **Anse* (Fig. 1243, p. 812).—"Exact enumeration of the nerve fibres [of the roots of the spinal nerves] has shown that the total number of entering and emerging fibres is the same on the two sides of the spinal cord, but it has further established that the individual roots of any one pair do not always contain the same number of fibres on both sides, and that the root-bundles are therefore often asymmetrical. Hence it happens that a particular nerve fibre does not always emerge in the same root; none the less, owing to the fact that their destinations are constant, aberrant fibres are by means of anastomoses reconducted into their appropriate paths. Anastomoses of this character are met with as high up as the nerve roots themselves; they are especially common between the cervical nerve roots, and are found more frequently connecting the sensory than connecting the motor nerve roots. Such anastomoses between the nerve roots are known as *anse* (loops)" (Von Langer and Toldt, *op. cit.*, p. 586). Quain says merely (*op. cit.*, vol. iii., part ii., p. 276) that "communications between the root filaments (especially the posterior) of adjoining nerves, are frequently met with"; but the term *anse* is not used by this author.

⁴¹⁶ *Third Occipital Nerve* (Fig. 1245, p. 813).—"From the cutaneous branch of [the internal branch of the posterior primary division of] the third [cervical] nerve an offset passes upwards

to the integument on the lower part of the occiput, lying at the inner side of the great occipital nerve; this is sometimes called the *third occipital nerve*." Quain (*op. cit.*, vol. iii., part ii., p. 280) thus describes this nerve as normal, though Toldt calls it a *variety*. It is not mentioned by Von Langer and Toldt in their "Anatomy."

⁴¹⁷ *Mammary Branches* (Fig. 1247, p. 815).—"From the lateral and anterior cutaneous nerves of the thorax special offsets are furnished to the mammary gland, the outer mammary branches being derived from the anterior branches of the lateral offsets of the fourth, fifth, and sixth intercostal nerves, and the inner mammary branches from the external branches of the anterior (terminal) offsets of the third and fourth intercostal nerves" (Von Langer and Toldt, *op. cit.*, p. 682).

⁴¹⁸ *Subscapular Nerves* (Ibid.).—There are usually three subscapular nerves. That which supplies the upper part of the subscapularis muscle, the smallest of the three, is the *upper subscapular nerve*; that which supplies the latissimus dorsi muscle, the largest of the three, is called by Quain the *middle or long subscapular nerve*, by Macalister the *long subscapular nerve*, and by Toldt *N. thoracodorsalis*; that which supplies the teres major muscle and the lower part of the subscapularis muscle is called by Quain the *lower subscapular nerve*, and by Macalister the *middle subscapular nerve*.

⁴¹⁹ *Communicating Cervical Nerves* (Fig. 1248, p. 816).—These are the branches from the second and third cervical nerves, respectively, which join the descending cervical nerve (*descendens noni*—see note ⁴²⁰ below) in the *ansa cervicalis* (see Fig. 1249, p. 817). There appears to be no complete Latin name for these branches in the author's terminology. He calls them *communicating branches to the ramus descendens nervi hypoglossi*.

⁴²⁰ *Descending Cervical Nerve* (Fig. 1249, p. 817).—Macalister denotes this nerve by the Latin name *nervus descendens cervicis*. It is, however, still very commonly known by the old name of *descendens noni*, the hypoglossal nerve, the twelfth cranial nerve of Soemmerring, being the ninth cranial nerve, *nervus nonus*, in the enumeration of Willis.

⁴²¹ *Ansa Cervicalis* (Ibid.).—This loop, formed by the union of the descending cervical nerve (see note ⁴²⁰ above) with the communicating cervical nerves (see note ⁴¹⁹ above), is often known in England by the name used by Toldt, *ansa hypoglossi*. This name, indeed, is more distinctive than the name *ansa cervicalis*, used by Quain, and the name *ansa infrahyoidea*, used by Macalister.

⁴²² *Cardiac Branches of the Pneumogastric Nerve* (Ibid.).—The cervical cardiac branches of the vagus arise both at the upper and the lower part of the neck. The upper cervical cardiac branches are small filaments which join the cardiac branches of the sympathetic; these are ignored in Toldt's nomenclature, and for this reason the lower cervical cardiac branch of the vagus, which arises at the lower part of the neck, is called by him *ramus cardiacus superior nervi vagi*. The thoracic cardiac branches of the vagus (on the left side usually arising from the inferior or recurrent laryngeal nerve) are by Toldt called *ramus cardiacus inferior nervi vagi*.

⁴²³ *Great Auricular Nerve* (Fig. 1250, p. 818).—In addition to facial and auricular branches, corresponding respectively to the *ramus anterior* and *ramus posterior* of Toldt, the great auricular nerve commonly sends an offset to the integument over the upper part of the sternocleidomastoid muscle and the mastoid process, which is separately named by Quain the *mastoid branch*. This branch is not accounted for in Toldt's nomenclature. Sometimes it is a separate offset of the cervical plexus, ascending between the great auricular and small occipital nerves.

⁴²⁴ *Phrenico-abdominal Branch* (Fig. 1252, p. 820).—"Some of the offsets of the phrenic nerve, *rami phrenico-abdominales*, pass

through the caval and oesophageal openings in the diaphragm, and also on the left side in front of the central tendon between the muscular fasciculi. For the most part these filaments are lost in the crura of the diaphragm, but some pass to the serous investment of the liver and to the coeliac plexus. The distribution of the phrenic nerve shows that it is not exclusively motor in function" (Von Langer and Toldt, *op. cit.*, p. 681). A description of these terminal offsets of the phrenic nerve is given by Quain, but neither this author nor Macalister makes use of the name **phrenico-abdominal branches*.

⁴²⁵ *Posterior Thoracic Nerves* (Fig. 1253, p. 821).—In the German official nomenclature the name *nervi thoracales posteriores* is a general name for the *n. dorsalis scapulae* and *n. thoracalis longus*, the nerve to the rhomboid muscles and the posterior thoracic nerve of English authors. The latter nerve was formerly known as the *external respiratory nerve of Bell*.

⁴²⁶ *Cords of the Brachial Plexus* (Fig. 1255, p. 823).—These are usually distinguished as *outer*, *inner*, and *posterior*, corresponding strictly to the *fasciculus lateralis*, *fasciculus medialis*, and *fasciculus posterior* of Toldt's nomenclature. Sometimes, however, the *outer cord* is called the *upper cord*, and the *inner cord* the *lower cord*, of the brachial plexus.

⁴²⁷ *Nerve to the Inner Head of the Triceps and Ulnar Collateral Nerve* (Ibid.).—The nerve to the inner head of the triceps divides into an upper, short branch, which passes immediately to the muscle, and a lower, long branch, "the ulnar collateral, which descends so close to the ulnar nerve that it often appears to join it." (Macalister, *op. cit.*, p. 298). Separating from the ulnar nerve a little above the elbow, it enters the lower short fibres of the internal or deep head. The name of *ulnar collateral nerve* was given to this long filament by Krause.

⁴²⁸ (Ibid.) According to Quain, the cutaneous area supplied by the musculocutaneous nerve lies entirely below the elbow, and the skin on the outer side of the elbow, to which in the specimen shown in Fig. 1255 a branch is furnished by the musculocutaneous nerve, is, according to Quain, normally supplied by the upper external cutaneous branch of the musculospiral nerve (*nervus cutaneus brachii posterior* of Toldt).

⁴²⁹ *Cutaneous Branches of the Musculospiral Nerve* (Fig. 1256, p. 824).—These are usually described by English anatomists as three in number: (1) *Internal cutaneous branch of the musculospiral nerve* (*posterior internal*, or *superior branch*, according to Macalister), arising in the axilla, often in common with the nerve to the inner head of the triceps (see note ⁴²⁷ above), and supplying the skin over the long head of the triceps muscle and behind the cutaneous area of the intercostohumeral nerve—this branch is identified by Quain with the *n. cutaneus brachii posterior* of the Continental nomenclature; (2) the *upper external cutaneous branch*, which supplies the lower half of the upper arm on its outer and anterior aspects (see Figs. 1270 and 1271, p. 835); (3) the *lower external cutaneous branch* (this branch and the previous one, which often arise in common from the main trunk, are called by Macalister the *posterior external cutaneous branch of the musculospiral nerve*), which supplies the outer half of the back of the forearm. Toldt ignores entirely the *internal cutaneous* offset of English anatomists, and describes two cutaneous branches only of the musculospiral nerve: the *nervus cutaneus brachii posterior*, the *upper external cutaneous branch*, and the *nervus cutaneus antibrachii dorsalis*, the *lower external cutaneous branch*, of the musculospiral nerve. As far, then, as Toldt's use of the German official nomenclature is concerned, Quain's identification of the *nervus cutaneus brachii posterior* with the *internal cutaneous branch of the musculospiral nerve* is erroneous.

⁴³⁰ *Radial Nerve* (Fig. 1257, p. 825).—It must be carefully noted that the *nervus radialis* of Continental anatomists is the *musculospiral* trunk of English writers. Just above the elbow this trunk divides into two terminal branches; one of these, *ramus superficialis nervi radialis* in the Continental nomenclature, a purely cutaneous nerve, is the *radial nerve* of English authors; while the other, *ramus profundus nervi radialis*, the muscular nerve of the back of the forearm, is known in England as the *posterior interosseous nerve* (see note ⁴³¹ below).

⁴³¹ *Posterior Interosseous Nerve* (Ibid.).—This name is by English anatomists applied to the nerve designated *ramus profundus nervi radialis* by Toldt (see note ⁴³⁰ above); and the name *nervus interosseus (antibrachii) dorsalis* is used on the Continent in a more restricted sense, as shown by the following quotation (Von Langer and Toldt, *op. cit.*, p. 687): "The *ramus profundus nervi radialis* winds round the neck of the radius, between the layers of the supinator radii brevis muscle, and is for the most part distributed to the muscular bellies in the upper part of the back of the forearm: one offset only, designated *nervus interosseus dorsalis*, extends as far down as the wrist-joint, supplying the three extensors of the thumb and the capsule of the wrist-joint." The pseudo-ganglionic enlargement of the lower end of this nerve is well shown in Fig. 1257.

⁴³² *Nerve to the Anconeus Muscle* (Ibid.).—According to both Quain and Macalister, this nerve descends to its destination within the substance of the *inner head* of the triceps muscle; but alike in the marginal description and that at the foot of Fig. 1257 the part of the triceps in which the course of the nerve to the anconeus muscle has been traced is called *caput laterale musculi tricipitis brachii*. As a matter of fact, though this part of the triceps is situate on the outer aspect of the muscle, all the fibres arising from the posterior surface of the humerus below and internal to the spiral groove, and even from the back of the lower part of the external intermuscular septum, are regarded as belonging to the *internal* or *deep* head of the triceps, though the outermost of these fibres pass inwards to their insertion into the outer margin of the common tendon. Some of these outer fibres of the internal head are usually continued below into the fibres of the anconeus muscle, and it is under cover of these fibres that the branch of the musculospiral nerve which supplies the latter muscle passes to its destination.

⁴³³ (Fig. 1258, p. 826). By Quain the terminal branches of the ulnar nerve are termed *superficial part* and *deep part*, respectively; in the text, however, I have followed the author's nomenclature in using the terms *superficial branch* and *deep branch*. More distinctive names would be *superficial terminal* and *deep terminal branch* of the ulnar nerve.

⁴³⁴ *Palmar Digital Nerves* (Fig. 1260, p. 828).—As in the case of the palmar digital arteries and veins, the author distinguishes between the digital nerves in the palm of the hand (before division) and the digital nerves on the palmar surfaces of the fingers (after division) as *nervi digitales volares communes* and *nervi digitales volares propriae*, respectively. This distinction is ignored by Quain and Macalister, but I have in the text named the palmar digital nerves before division (*common*) *palmar digital nerves*, and after division *collateral palmar digital nerves*.

⁴³⁵ *Perforating Branches of the Deep Part of the Ulnar Nerve* (Fig. 1261, p. 829).—The twig to which in Fig. 1261 the name of *perforating branch* is given has no Latin name in the author's terminology, being called merely (in German) *offset to the dorsal surface of the metacarpus*. Quain, however, writes (*op. cit.*, vol. iii., part ii., p. 300: "Rauber describes small *perforating branches*, which accompany the superior perforating arteries in

the interosseous spaces, and join the terminal filaments of the posterior interosseous nerve."

⁴³⁶ **Anterior Brachial Cutaneous Branches of the Internal Cutaneous Nerve* (Fig. 1262, p. 830).—Macalister gives no special name to these branches; and Quain calls them merely *branches to the integument of the arm*, a name insufficiently distinctive. I have therefore used in the text a literal translation of the Latin name employed by the author, *rami cutanei brachii anteriores nervi cutanei antibrachii medialis*.

⁴³⁷ **Ulnar Communicating Branch* (Fig. 1265, p. 831).—Describing the *dorsal digital branches* of the radial nerve (*ramus superficialis nervi radialis*—see note ⁴³⁰ above), Von Langer and Toldt write (*op. cit.*, p. 687): "A fine branch of communication passes from the nerve to the middle finger to the corresponding offset of the ulnar nerve." Quain describes this communication between the dorsal digital branches of the radial and ulnar nerves respectively, but gives no special name to the communicating branches; and Macalister writes (*op. cit.*, p. 299): "A *communicating branch* (of the radial nerve) joins the dorsal branch of the ulnar, and with it gives a common supply to the cleft between the middle and ring fingers."

⁴³⁸ *Sacral and Pudic Plexuses* (Fig. 1272, p. 836).—"In the description of the sacral plexus a division is sometimes made into two subordinate plexuses. The larger upper part, which ends in the great sciatic nerve and gives off the other branches to the limb, is distinguished as the *sciatic plexus* (*plexus ischiadicus*), while the smaller lower part, including the pudic nerve together with the visceral and muscular branches of the third and fourth sacral nerves, is designated the *pudic plexus* (*plexus pudendus*)" (Quain, *op. cit.*, vol. iii., part ii., p. 324). It must be observed that the author uses the term *plexus sacralis*, not in the wider sense of the above quotation, but to denote merely what is there called the *sciatic plexus*. This latter term, however, is not current in England, and I have therefore used the name *sacral plexus* as the English equivalent of the *plexus sacralis* of the author. The *pudic plexus* (*plexus pudendus*) comprises a part of the third and nearly all the fourth sacral nerve; its branches are, in addition to the large *pudic trunk*, *muscular branches* to the levator ani and coccygeus muscles and to the external sphincter of the anus (*hemorrhoidal* or *perineal* branch), and *visceral branches* (*middle hemorrhoidal*, *inferior vesical*, and *vaginal* nerves). A small filament from the fourth sacral nerve combines with the fifth sacral nerve and the coccygeal nerve to form what is sometimes named the *coccygeal plexus*, and this latter gives rise to the *anococcygeal* or *subcaudal nerve*. The pudic and coccygeal plexuses as described above are treated by Macalister as a single plexus, to which he gives the name of *pudendo-anal plexus*.

⁴³⁹ *Rami Cutanei Femoris Anteriores* (Fig. 1273, p. 837).—"Among the cutaneous offsets of the anterior crural or femoral nerve are the **anterior cutaneous branches of the thigh*. Two to four in number, they perforate the deep fascia at different levels, and ramify on the front of the thigh; one of these branches accompanies the femoral portion of the internal saphenous vein" (Von Langer and Toldt, *op. cit.*, p. 692). Under this name of **anterior cutaneous branches of the thigh*, the author includes the *middle cutaneous* and *internal cutaneous nerves* of English anatomists. As far as possible, I have in the text discriminated between these nerves, in accordance with the English nomenclature.

⁴⁴⁰ *Divisions of the Obturator Nerve* (Fig. 1275, p. 839).—The *anterior* or *superficial part* of the obturator nerve (*ramus anterior nervi obturatorii*) and the *posterior* or *deep part* of the obturator nerve (*ramus posterior nervi obturatorii*) are by Macalister called *anterior obturator nerve* and *posterior obturator nerve*, respectively.

⁴⁴¹ (Ibid.) The cutaneous branch of the anterior crural nerve mentioned in the text may be derived either from the internal cutaneous or the internal saphenous branch of the anterior crural or femoral nerve, for communicating offsets from both these nerves combine with the cutaneous branch of the obturator nerve to form an interlacement beneath the lower end of the sartorius muscle.

⁴⁴² *N. Tibialis* (Fig. 1276, p. 840).—In the author's nomenclature, the name *nervus tibialis* is given to the larger of the two terminal branches of the great sciatic nerve from the point of division of the parent trunk until the **tibial* nerve itself divides (usually just below the internal annular ligament of the ankle) into the internal and external plantar nerves. In England, however, the upper part of this nerve, as far as the lower border of the popliteus muscle, is known as the internal popliteal nerve, and for the rest of its course it receives the name of posterior tibial nerve. Macalister speaks of the terminal branches of the great sciatic nerve as the peroneal and popliteal nerves, respectively; but in his terminology also the latter nerve changes its name to posterior tibial at the lower border of the popliteus muscle.

⁴⁴³ *Inferior Pudendal Nerve* (Fig. 1277, p. 841).—In the specimen shown in Fig. 1277 the name inferior pudendal nerve (*rami perineales nervi cutanei femoris posterioris* in the author's terminology) is attached to two distinct branches of the small sciatic trunk. These two branches represent the principal branches of distribution of the inferior pudendal nerve when the nerve is normal. This variety is frequently met with.

⁴⁴⁴ *Calcaneopplantar Nerve* (Fig. 1279, p. 843).—According to Quain (*op. cit.*, vol. iii, part ii, p. 333), "the calcaneopplantar nerve is given off by the posterior tibial in the lower part of the leg, and becomes superficial by piercing the internal annular ligament. It divides into internal calcaneal branches which ramify in the integument on the inner side of the heel, and plantar cutaneous branches which supply the skin of the inner and hinder part of the sole." The *rami calcanei mediales* of Toldt include the plantar cutaneous as well as the internal calcaneal branches of the calcaneopplantar nerve; thus, in Fig. 1279, of the branches labelled internal calcaneal, the anterior set are really the plantar cutaneous branches of English anatomists.

⁴⁴⁵ **Interosseous Nerve of the Leg* (Ibid.).—"The nerve to the popliteus muscle, which arises from the internal popliteal nerve near the lower end of the popliteal space, gives off the slender *nervus interosseus cruris*; this descends partly in the substance of the interosseous membrane, partly on the posterior surface of this membrane, which it supplies, giving fine filaments also to the periosteum of the tibia, while its terminal offsets supply the inferior tibiofibular articulation and the ankle-joint" (Von Langer and Toldt, *op. cit.*, pp. 694, 695). In England this small nerve is not usually dignified by the name of **interosseous nerve of the leg*. Quain and Macalister merely state that the nerve to the popliteus muscle gives a branch to the interosseous membrane.

⁴⁴⁶ *External Terminal Branch of the Anterior Tibial Nerve* (Fig. 1281, p. 845).—The branch in Fig. 1281 labelled muscular branch to the *extensor brevis digitorum pedis* muscle, together with the branches labelled offsets to the tarsal joints, represent what is usually known in English anatomical nomenclature as the external terminal branch of the anterior tibial nerve (the internal terminal branch being that which supplies the dorsal digital nerves of the outer side of the great toe and the inner side of the second toe). The external terminal branch resembles the posterior interosseous nerve of the forearm in presenting, as a rule, a pseudo-

ganglionic enlargement. This is, however, not shown in Fig. 1281.

⁴⁴⁷ *Jugular Ganglion* (Fig. 1296, p. 858).—The upper ganglion or ganglion of the root of the pneumogastric or vagus nerve, the ganglion jugulare of the official German nomenclature, is, owing to its situation in the jugular foramen, sometimes known in England also by the name of jugular ganglion. The name is, however, better avoided, since its employment may lead to confusion with the upper ganglion of the glossopharyngeal nerve, which is always known in England by the name of jugular ganglion (*ganglion superius nervi glossopharyngei* in the official German nomenclature; sometimes called Ehrenwitter's ganglion by German writers). This latter is also shown in Fig. 1296, just below the Roman figure IX.

⁴⁴⁸ *Visceral Arches and Visceral Clefts* (Fig. 1296, p. 858).—In the German original these structures are called *Kiemenbogen* and *Kiemenpalte*, respectively; literally, branchial arch and branchial cleft. This name depends on the respiratory function of these structures in the primitive ancestral vertebrates; but since this function is now obsolete, the names used in the text are to be preferred. In England also, however, some anatomists call the clefts branchial clefts or gill-slits; and of the arches, while the first is the mandibular arch, and the second the hyoid arch, the remainder are sometimes called branchial arches. The first or mandibular visceral arch sends forward on each side a process from which the upper jaw is formed; this is known as the maxillary process (*Oberkieferfortsatz*). The distal portion of the first arch, from which the lower jaw is formed, is by Toldt distinguished as the **mandibular process* (*Unterkieferfortsatz*), but this name is not used by Quain. (The primitive cartilage of the lower jaw is usually called Meckel's cartilage.)

⁴⁴⁹ *Nasal Nerve* (Fig. 1298, p. 859).—In the German official nomenclature, the *nervus nasociliaris* gives off the *nervus ethmoidalis anterior* through the anterior ethmoidal foramen to the nasal cavity. These form the proximal and distal portions, respectively, of the nasal nerve of English authors. The latter is known also as the oculosal and as the nasociliary nerve.

⁴⁵⁰ **Posterior Nasal Branches* (Fig. 1298, p. 859).—The **rami nasales posteriores* of the official German nomenclature include the following branches in Quain's terminology: (1) the nasopalatine nerve; (2) the small upper nasal branches of Meckel's ganglion; (3) the inferior nasal branches of the large or anterior palatine nerve.

⁴⁵¹ *Canalis Incisivus* (Fig. 1302, p. 862).—The author appears to use this term indifferently of the canals of Scarpa and of the canals of Stensen. The former transmit the nasopalatine nerves; the latter, the palatine branches of the nasopalatine arteries.—See Macalister, *op. cit.*, p. 635.

⁴⁵² *Petrosal Nerves* (Fig. 1303, p. 863).—The great superficial petrosal nerve (sometimes called the white portion of the Vidian nerve) and the small superficial petrosal nerve (long root of the otic ganglion) are identical respectively with the *nervus petrosus superficialis major* and *nervus petrosus superficialis minor* of the German official nomenclature. Of the deep petrosal nerves of English anatomists, the great deep petrosal nerve (sometimes called the grey portion of the Vidian nerve) is in the German nomenclature known as the *nervus petrosus profundus* without further qualification. The small deep petrosal nerve (a branch from the tympanic plexus to the internal carotid plexus) must be identified with the *nervus caroticothympanicus superior* of the German nomenclature (see Fig. 1317, p. 874, and Fig. 1328, p. 886). Finally, the external superficial petrosal nerve, an occasional branch connecting the geniculate ganglion with the sympathetic on the middle meningeal artery, is apparently ignored by Toldt.

⁴⁵³ *Sublingual Nerve* (Fig. 1304, p. 864).—Macalister distinguishes by this name "a branch which passes external to and supplies the sublingual gland, the gums, and the mucosa beneath the tongue" (*op. cit.*, p. 599). This is the *nervus sublingualis* of the German official nomenclature. Quain says merely that "some delicate filaments are distributed to the sublingual gland."

⁴⁵⁴ *Deep Temporal, Buccal, and Masseteric Nerves* (Fig. 1305, p. 865).—The arrangement of these branches of the inferior maxillary nerve being a somewhat variable one, different authors have accepted different arrangements as the normal. Quain describes the *deep temporal nerves* as usually three in number, the *anterior* being given off by the *buccal nerve* after it has perforated the external pterygoid muscle, the *middle* arising independently, and the *posterior* generally conjoined with the *masseteric nerve*. According to Von Langer and Toldt (*op. cit.*), the *buccal nerve* (*n. buccinatorius*) consists of sensory fibres only, and the *deep temporal nerves*, two only in number, *anterior* and *posterior*, and the *masseteric nerve* are independent branches of the inferior maxillary nerve. Macalister also describes two *deep temporal nerves* only, the *anterior* arising a little in front of the *buccal nerve*, and the *posterior* dividing into two branches, the *masseteric* and the *posterior temporal*. A *middle deep temporal nerve* is, however, shown by Toldt in Fig. 1320, p. 877. In the text I have not attempted to harmonize these discrepancies, but have followed Toldt's nomenclature.

⁴⁵⁵ **Rami Nasales Interni* (Fig. 1306, p. 866).—The **internal nasal branches* of the *infra-orbital nerve*, supplying the skin just within the margin of the nostril, are not distinguished by Quain from the *lateral nasal branches* of this nerve.

⁴⁵⁶ *Mental and Inferior Labial Branches* (Fig. 1306, p. 866).—"The *mental or labial nerve*," according to Quain (*op. cit.*, vol. iii., part ii., p. 247), "emerging from the bone by the mental foramen, divides beneath the depressor anguli oris into three parts—an inferior, which descends to the integument of the chin, and two superior, which ascend to the skin and mucous membrane of the lower lip." By this author, however, these branches are not distinguished by the names used in the text.

⁴⁵⁷ *Divisions of the Inferior Maxillary Nerve* (Fig. 1307, p. 867).—After giving off the *recurrent or middle meningeal branch*, the inferior maxillary nerve divides, about $\frac{1}{8}$ inch below the foramen ovale, into two primary branches, called by Quain the *small, anterior, or upper portion*, and the *large, posterior, or lower portion*, respectively; and by Macalister, *superior branch* and *inferior branch* respectively. The *large or posterior portion*, chiefly sensory in function, divides into three trunks, the *auriculotemporal*, *lingual*, and *inferior dental nerves*. The *small or anterior portion*, chiefly motor, gives, in addition to the *buccal nerve* (sensory in function), the nerves to the temporal, masseter, and external pterygoid muscles (see above, note ⁴⁵⁴); for this reason it is known in German as the *nervus masticatorius*. Functionally, the *internal pterygoid nerve* belongs also to the **masticatory nerve*; usually, however, this branch arises from the undivided trunk.

⁴⁵⁸ *Sphenomaxillary Muscle* (Fig. 1309, p. 868).—"In the region of the sphenomaxillary fissure, incorporated with the orbital periosteum, there is a layer of smooth muscular fibres, having the appearance of a greyish-red mass. This is the so-called *musculus orbitalis*" (Von Langer and Toldt, *op. cit.*, p. 783). This layer of unstriated muscular tissue was first described by Müller, and sometimes goes by the name of *Müller's muscle*. But Müller also described a layer of unstriated muscular tissue met with in each eyelid, and these layers also go by the name of *Müller's muscle*. (By Toldt they are called *Mm. tarsales superior*

et inferior—see Fig. 1386, p. 910, and note ⁴⁰⁴ below.) Gowers, for instance, writes ("Diseases of the Nervous System," 2nd ed., vol. ii., pp. 886, 887): "The unstriated muscular fibres of Müller, which are innervated by the sympathetic and run from the eyelid to the membranous lining of the orbit, are generally believed to be capable, by their contraction, of causing prominence of the eyeball." On the other hand, when Fagge, writing also on exophthalmos, states: "A third hypothesis is that exophthalmos may in part be caused by contraction of Müller's non-striated orbital muscle" ("Medicine," 2nd ed., vol. i., p. 1011), he refers to the layer of smooth muscular fibres bridging over the sphenomaxillary fissure. To avoid this confusion, the use of the term *Müller's muscle* should be abandoned, and the *musculus orbitalis* of the German official nomenclature should be denoted in England by the name of *sphenomaxillary muscle*. (This name is used by Quain—*op. cit.*, vol. iii., part ii., p. 4, footnote.)

⁴⁵⁹ *Superficial Temporal Nerve* (Fig. 1313, p. 870).—According to Quain's nomenclature, the *auriculotemporal nerve*, on emerging from beneath the parotid gland and passing upwards over the zygoma, becomes the *superficial temporal nerve*. In the German official nomenclature, the nerve remains the *nervus auriculotemporalis* until it breaks up into the *rami temporales superficiales* shown in Fig. 1313. The *superficial temporal nerve* of Quain is by Macalister named the *terminal branch* of the auriculotemporal nerve.

⁴⁶⁰ **Ansa Cervicalis Superficialis* (Fig. 1313, p. 870).—I mark this term with an asterisk because it is used neither by Quain nor by Macalister. Both of these authors describe the loop or loops of communication, on the outer surface of the sternocleidomastoid muscle, between the superficial cervical nerve and the cervical or inframaxillary branch of the facial nerve, but neither denotes the communication by any distinctive name. The drawback to the use in England of the Continental name of *ansa cervicalis superficialis* is that the name *ansa cervicalis* is already in use in this country to denote the loop of communication known on the Continent as the *ansa hyoglossi* (see Fig. 1249, p. 817, and Fig. 1320, p. 877). All possibility of confusion would be avoided if the loop of communication between the *facial* and the *superficial cervical nerves* were to be termed *ansa cervicofacialis*, but as this name is a neologism I have not ventured to incorporate it in the text.

⁴⁶¹ *Pes Anserinus* (Fig. 1314, p. 871).—This is the name usually employed in England to denote the radiating plexus formed in the parotid gland and on the side of the face by the branches of the facial nerve as they pass to their destination. In the German official nomenclature this structure is known as the *plexus parotideus*, the name *pes anserinus* being given on the Continent to an entirely different structure, viz., the aponeurotic expansion of the tendon of insertion of the sartorius muscle.—See footnote to p. 351 in Part III.

⁴⁶² *Inferior or Recurrent Laryngeal Nerve* (Fig. 1315, p. 872).—In the German official nomenclature this nerve, at its first origin from the vagus trunk, is known as the *nervus recurrens*; only after it has furnished numerous *tracheal* and *asophageal branches* does the *terminal branch* (as it is esteemed) of the nervus recurrens receive the name of *nervus laryngeus inferior*. In England the nerve is called indifferently *inferior laryngeal* or *recurrent laryngeal nerve* throughout its whole course.

⁴⁶³ (Fig. 1315, p. 872).—Sometimes known in England also as the *jugular ganglion* of the vagus nerve. (Macalister makes use of this name.) It is better, however, to reserve the name *jugular ganglion* for the upper ganglion of the glossopharyngeal nerve.—See also note ⁴⁴⁷ above.

⁴⁶⁴ **Œsophageal Cords, Anterior and Posterior* (Fig. 1315, p. 872).—As this name is used neither by Quain nor by Macalister, I quote the following passage from Von Langer and Toldt (*op. cit.*, p. 716): "The name of *chordæ œsophagæ, anterior et posterior*, is given to two nervous trunks, one of which descends along the anterior, the other along the posterior surface of the œsophagus. These trunks are connected by means of numerous offsets, which, as they pass from one trunk to the other, branch and reunite to form the *plexus œsophagus*. From this plexus arise a large number of *rami œsophagei* for the thoracic and abdominal portions of the œsophagus. The œsophageal cords are the continuations of the trunks of the pneumogastric or vagus nerves; they are differentiated from these latter by the fact that each cord receives from the other numerous branches of communication; but, notwithstanding this, the *posterior œsophageal cord* must be regarded as the continuation of the *right pneumogastric*, and the *anterior œsophageal cord* as the continuation of the *left pneumogastric nerve*. This peculiar relation of the œsophageal cords to the œsophagus is brought about by the rotation of the stomach which takes place during intra-uterine life, as a result of which the primitive left side of the stomach becomes the anterior surface, and the primitive right side becomes the posterior surface of that organ.

⁴⁶⁵ *Gastric Plexus* (Fig. 1315, p. 872).—Quain and Macalister both speak of the *gastric plexus* as a single whole. Toldt, on the other hand, describes four separate plexuses, *anterior, posterior, superior, and inferior gastric plexuses*. The difference is not one of much importance. It is true that the nerve-supply of the stomach may be said to reach that organ in four sets of branches: to the front of the stomach from the *left pneumogastric*, to the back from the *right pneumogastric nerve* (see note ⁴⁶⁴ above); to the small curvature from the solar plexus by the branches that accompany the coronary artery of the stomach and form the *coronary plexus*, to the great curvature (also primarily from the sympathetic) by the *right and left gastro-epiploic plexuses*. But when we remember that not only do the nerves from these different sources intermingle freely on the walls of the stomach, but further that, by means of the *celiac branches* of the vagus (see note ⁴⁶⁶ below), vagal fibres are incorporated with many (if not all) of the branches of the solar plexus, it seems that the *gastric plexus* can be more usefully regarded as forming a single whole.

⁴⁶⁶ *Celiac Branches* (Fig. 1315, p. 872).—Quain, in his account of the *gastric branches* of the pneumogastric nerve, remarks that a large portion of the right nerve passes to the solar, splenic, and left renal plexuses of the sympathetic; but he does not mention the *celiac branches* more particularly, nor is this name used by Macalister. Von Langer and Toldt (*op. cit.*, p. 717) state that of the fibres of the "posterior œsophageal cord (right pneumogastric or vagus nerve—see note ⁴⁶⁴ above) a small part only passes in the form of *gastric branches* to the *posterior gastric plexus* (see note ⁴⁶⁵ above); "the greater part of the fibres of this cord pass as *celiac branches* along the coronary artery of the stomach to the celiac axis, where they join the semilunar ganglia."

⁴⁶⁷ *Jugular Ganglion* (Fig. 1316, p. 873).—This name, here given to the *ganglion superius nervi glossopharyngei* of the Continental nomenclature, is by some English authors given to the *upper ganglion* or *ganglion of the root of the pneumogastric nerve*. (See note ⁴⁶⁷ above.) The jugular ganglion of the glossopharyngeal nerve is known also as *Ehrenritter's ganglion*.

⁴⁶⁸ *Caroticothympanic Nerves* (Fig. 1317, p. 874).—Quain writes (*op. cit.*, vol. iii., part ii., p. 260): "The communicating branches (of the tympanic nerve) are, in addition to the small superficial petrosal nerve with its filament of union with the facial, one or

two twigs (*caroticothympanic*) which pass downwards and forwards through the anterior wall of the tympanum to the carotid canal and join the sympathetic on the carotid artery, and the *small deep petrosal nerve* which runs forwards in a minute canal in the substance of the processus cochleariformis and enters the foramen lacerum, where it joins the carotid plexus of the sympathetic, or sometimes one of the large petrosal nerves."—If I am right in identifying the *nervus caroticothympanicus superior* with the *small deep petrosal nerve* of English authors (see note ⁴⁶² above)—Von Langer and Toldt's description is not sufficiently minute to make this point quite clear—the *nervus caroticothympanicus inferior* should perhaps be called the *caroticothympanic nerve* without further qualification.

⁴⁶⁹ **Jugular Nerve* (Fig. 1317, p. 874).—Quain describes this nerve, but uses only the name used on the Continent, *N. jugularis* (and that in a parenthesis merely). He writes: "Another branch [of the superior cervical ganglion], which is directed upwards from the ganglion, divides at the base of the skull into two filaments, one of which ends in the petrosal ganglion of the glossopharyngeal nerve; while the other, entering the jugular foramen, joins the ganglion of the root of the pneumogastric."—*Jugular nerve*, the English equivalent of the *nervus jugularis* of the official German nomenclature, is a name at once distinctive and appropriate, and may well be adopted.

⁴⁷⁰ (Fig. 1317, p. 874).—The name *musculus hyopharyngeus* is used here by Toldt, but nowhere else in this work, to denote the *middle constrictor of the pharynx*. The parts of this muscle attached respectively to the great and the small cornu of the hyoid bone are, however, often known as the *ceratopharyngeus* and *chondropharyngeus* muscles. The *thyropharyngeus* muscle is the upper part of the inferior constrictor of the pharynx.—See Fig. 706, p. 433, in Part III., and note ¹ to same page.

⁴⁷¹ **Cardiac Plexus* (Fig. 1321, p. 878).—English anatomists make a distinction, which is ignored by Toldt, between a *superficial* and a *deep cardiac plexus*. The *superficial cardiac plexus* lies in the concavity of the arch of the aorta, between the ligamentum arteriosum and the right pulmonary artery; it receives the left superior cardiac nerve (of the sympathetic system) and the lower cervical cardiac branch of the left pneumogastric nerve; it contains the ganglion of *Wrisberg* (see Fig. 1330, p. 887). The *deep cardiac plexus* lies behind the arch of the aorta, in front of the lower end of the trachea, and above the bifurcation of the pulmonary artery; much larger than the superficial cardiac plexus, it receives all the cardiac nerves with the exception of the two mentioned above.

⁴⁷² **Lowest Cardiac Nerve* (Fig. 1326, p. 884).—This nerve is not mentioned by Quain or by Macalister. It is described in the following terms by Von Langer and Toldt (*op. cit.*, p. 721): "The *nervus cardiacus imus* is the lowest of the cardiac nerves. It arises from the first thoracic ganglion, and, having joined the inferior cardiac nerve, passes to the cardiac plexus. When the inferior cervical ganglion and the first thoracic ganglion are conjoined, the lowest and the inferior cardiac nerves form a common trunk, which arises from the ganglion by two or by three roots."

⁴⁷³ **Spinovertebral Nerves* (Fig. 1329, p. 886).—Quain writes (*op. cit.*, vol. iii., part ii., p. 278): "Before dividing [into anterior and posterior primary divisions] each spinal nerve gives off a small *recurrent or meningeal branch*, which is joined by a filament from the communicating cord between the anterior division of the nerve and the sympathetic, and then runs inwards through the intervertebral foramen to the spinal canal, where it is distributed to the vertebræ and ligaments, the bloodvessels of the canal, and to the dura mater (Luschka, Rüdinger)." To the

intraspinal nerves formed in this manner by the union of the recurrent or meningeal branches of the spinal nerves with the sympathetic filaments from the rami communicantes, Toldt gives the name of *nervi sinuvertebrales*, a term used neither by Quain nor by Macalister.

⁴⁷⁴ *Celiac Plexus* (Fig. 1331, p. 888).—The term *plexus celiacus* is used by the author in a comprehensive sense, equivalent to the *solar* or *epigastric plexus* of English writers. In England the term *celiac plexus* is used to denote the anterior and upper part only of the solar plexus, which ensheathes the celiac axis, and subdivides, with that vessel, into the *coronary, hepatic, and splenic plexuses*.

⁴⁷⁵ *Smallest Splanchnic Nerve* (Ibid.).—The *renal branch* of the small splanchnic nerve is sometimes represented by a separate branch from the last thoracic ganglion to the renal plexus. This nerve was termed by Walter *nervus renalis posterior*, but is generally known in England as the *smallest splanchnic nerve*.

⁴⁷⁶ *Vesical Nerves* (Fig. 1333, p. 890).—The nerves in Fig. 1333 to which the names of *superior* and *inferior vesical nerves* are given are the branches proceeding from the *vesical plexus* to the upper and lower hemispheres, respectively, of the urinary bladder. The *inferior vesical nerves* shown in Fig. 1272, p. 836, on the other hand, are branches of the fourth sacral nerve (*pudic plexus*, see note ⁴³⁸ above) destined for the bladder, for the most part by way of the vesical plexus of the sympathetic.

⁴⁷⁷ *Hypogastric and Pelvic Plexuses* (Ibid.).—In the author's nomenclature the *plexus hypogastricus* is said to divide below into right and left portions, which still go by the name of *plexus hypogastricus*. In Quain's nomenclature the term *hypogastric plexus* denotes the upper median portion only of the *plexus hypogastricus* of Toldt, the paired lower portions being termed by Quain *right and left pelvic or inferior hypogastric plexuses*.

⁴⁷⁸ *Perichoroidal Space and Lamina Suprachoroidæa* (Fig. 1337, p. 893).—In describing the lymph space between the sclerotic and the choroid, neither Quain nor Macalister employs the name *spatium perichoroidæale* or its English equivalent, *perichoroidal space*, but these names are used by other English authorities. In describing parts of the eye Latin names are most commonly used, *lamina suprachoroidæa*, for example, rather than *suprachoroidal membrane*, etc.

⁴⁷⁹ *Circular Ciliary Muscle* (Ibid.).—The *circular fibres* of the ciliary muscle, forming a ring round the insertion of the iris, make up the *circular ciliary muscle* of Müller, which is well developed in hypermetropic eyes, but atrophied, or even wanting, in myopic eyes.

⁴⁸⁰ *Zonule of Zinn or Suspensory Ligament of the Lens* (Ibid.).—The zonule of Zinn extends from the ora serrata forwards and inwards over the ciliary body, and thence inwards to be attached to the capsule of the lens. The inner few portion only of this structure is strictly entitled to the name *suspensory ligament of the lens*, but as this ligament is the functionally important part of the zonule of Zinn, and as the term *suspensory ligament of the lens* finds no place in Toldt's nomenclature, I have in the text rendered the term *zonula ciliaris* (Zinni) as *zonule of Zinn* or *suspensory ligament of the lens*. The *fibre zonulares* are the radiating meridional fibres of which the zonule is made up. "Between the fibres of the zonule are numerous interspaces, the *spatia zonularia* (zonular spaces), which communicate with the posterior chamber, and are therefore filled with aqueous humour. A closed canal, such as was formerly believed to exist in the substance of the suspensory ligament of the lens, encircling the equator of the lens, known as the *canal of Petit*, has, however, no real existence" (Von Langer and Toldt, *op. cit.*, p. 771).

⁴⁸¹ *Rima Cornæalis* (Ibid.).—"The transition from the con-

nective-tissue elements of the sclerotic into those of the cornea takes place along a sharply-defined circular zone in such a manner that the tissue of the sclerotic overlaps the margin of the corneal tissue, now in front, now behind, and thus the anterior margin of the sclerotic is, as it were, grooved to receive the corneal margin. This connection between the two structures receives the name of *rima cornæalis*" (Von Langer and Toldt, *op. cit.*, p. 756). Both Quain (*op. cit.*, vol. iii., part iii., p. 17) and Macalister (*op. cit.*, p. 668) describe the connexion between the sclerotic and the cornea in similar terms, the latter writer saying, "In section the sclerotic seems to overlay the cornea, as the bezel overlaps the glass in a watch"; but neither of these authorities employs the name *rima cornæalis*.

⁴⁸² *Annulus Ciliaris and *Orbiculus Ciliaris* (Figs. 1338, 1339, p. 894).—These terms are not used by Quain, and I therefore quote definitions of their meaning from Von Langer and Toldt: "The middle coat of the eyeball, *tunica vasculosa oculi* . . . consists of two portions: a posterior and larger, the *choroid (coat)*, and an anterior and smaller, the *iris*. The boundary-line between these two portions, which in position corresponds to the **rima cornæalis* [see note ⁴⁸¹ above], is indicated on the convex surface of the middle coat when the outer coat has been removed by the anterior margin of a prominent pale blue tinted ring, the **annulus ciliaris*. Along this boundary-line the middle and outer coats of the eye are more firmly connected with one another than is elsewhere the case" (*op. cit.*, p. 760). "The ciliary body is separated from the region of the ora serrata of the retina by a narrow ring-shaped zone of the choroid, usually somewhat darker in colour than the rest, known as the **orbiculus ciliaris*. We thus recognise three regions in the choroid: an anterior, the *ciliary body*, a middle, the **orbiculus ciliaris*, and a posterior (much larger than the others), the *smooth portion* of the choroid. These three portions are clearly differentiated one from another by the arrangement of their bloodvessels" (*op. cit.*, p. 760).

⁴⁸³ *Plexus Gangliosis Ciliaris* (Fig. 1340, p. 894).—The *ciliary gangliated plexus* lies within the substance of the ciliary muscle. The ciliary nerves form two other gangliated plexuses in connexion with the middle coat of the eye, one on the outer surface of the choroid, and the other within the substance of the iris. See Quain, *op. cit.*, vol. iii., part iii., p. 35.

⁴⁸⁴ *Ciliary Folds* (Figs. 1342, 1343, p. 895).—"In between the well-developed ciliary processes are small, slightly projecting eminences, having the same radial disposition as the processes. These are known as the *plicæ ciliares*" (Von Langer and Toldt, *op. cit.*, p. 760). These structures are not mentioned by Quain or Macalister.

⁴⁸⁵ *Corona Ciliaris and Corpus Ciliare* (Figs. 1341 to 1343, p. 895).—"The ring of ciliary processes surrounding the iris constitutes as a whole the *corona ciliaris*. The anterior portion of the choroid (with the ciliary processes) constitutes what is known as the *ciliary body (corpus ciliare)*" (Von Langer and Toldt, *op. cit.*, p. 760).

⁴⁸⁶ *Layers of the Choroid* (Fig. 1344, p. 895).—The choroid is bounded both externally and internally by non-vascular membranes. The external layer, similar to the lamina fusca of the sclerotic (from which it is separated by the perichoroidal lymph space) is known as the *suprachoroidal membrane* or *lamina suprachoroidæa* (see note ⁴⁷⁸ above). The internal layer, adjacent to the pigmentary layer of the retina, structureless and transparent, is generally known in England as the *membrane of Bruch*; but sometimes, from its glassy appearance, as the *lamina vitrea* (in German, *Glashaute*); in the official German nomenclature it is termed the *lamina basalis*. Between the suprachoroidal mem-

brane and the membrane of Bruch is the richly vascular *choroid proper*, which itself consists of two strata—an *outer*, containing the larger bloodvessels, and an *inner*, containing the capillary ramifications. The outer, taking its name from the large venous plexuses in its substance, is known as the *vascular layer* or *lamina vasculosa*. The inner, capillary layer is generally spoken of both in England and Germany by the Latin name of *lamina (or tunica) choriocapillaris*, but is also known as the *tunica Ruyschiana*. Between the vascular layer and the choriocapillaris is an intermediate layer of connective tissue rich in elastic fibres and containing hardly any pigment; this layer, unimportant in man, is the tissue which in some mammals is so developed as to produce the appearance known as the *tapetum*.

⁴⁵⁷ *Annuli Iridis, Minor et Major, and the Crypts and Contraction-Folds of the Iris* (Figs. 1346 to 1348, p. 896).—"In the anterior surface of the iris a peculiar moulding is to be distinguished, partly dependent on the arrangement of its bloodvessels. First of all, we note at a distance of about 1 millimetre ($\frac{1}{16}$ inch) from the pupillary margin of the iris, and parallel therewith, a somewhat sinuous little ridge, by which the iris is divided into two zones, the smaller of which, adjoining the pupil, is known as the *pupillary zone*, *annulus iridis minor*, while the larger, peripherally situate and extending outwards to the ciliary margin of the iris, is known as the *ciliary zone*, *annulus iridis major*. In the pupillary zone the anterior surface of the iris is beset with a number of small depressions (*crypts*), which are surrounded by delicate arborescent elevations. The ciliary zone is often somewhat lighter in tint, and displays on its anterior surface a series of from three to five furrows, concentrically surrounding the pupil, and between these furrows is a corresponding number of blunted tumuli (*contraction-folds*). In its peripheral marginal region the anterior surface of the iris is beset with numerous depressions, usually somewhat darkly coloured. Along the ciliary margin the superficial layers of the stroma of the iris are more loosely woven than elsewhere, so that delicate trabeculae are formed, connecting the edge of the iris with the rather ragged edge of the posterior elastic lamina of the cornea. The circle of these trabeculae, in the angle between the cornea and the iris, constitutes the so-called *ligamentum pectinatum iridis*, which itself forms the inner wall of the canal of Schlemm" (Von Langer and Toldt, *op. cit.*, pp. 760, 761). The vascular rings within the substance of the iris, *circulus minor* and *circulus major*, are described by Quain, but the division of the iris into an *annulus minor* or *pupillary zone* and *annulus major* or *ciliary zone*, dependent on these vascular arrangements, is not mentioned by the English author, nor does he describe the *crypts* and the *contraction-folds* of the iris. The last-named, however, are alluded to by Macalister.

⁴⁵⁸ *Pigmentary Layer of the Iris* (Figs. 1346, 1348, 1349, p. 896).—This term is a literal translation of the *stratum pigmenti iridis* of the official German nomenclature. The pigmentary layer of the iris is also variously known, according to the point of view, as the *pars retinalis iridis*, *pars iridica retinae*, and *axial pigment of the iris*. Regarding the free border of the pigmentary layer (see Fig. 1346), Quain writes (*op. cit.*, vol. iii., part iii., p. 31), "The pigmentary layer . . . ends abruptly at the margin of the pupil," but Macalister remarks (*op. cit.*, p. 671), "The pigment usually extends into the pupillary zone, defining its border."

⁴⁵⁹ *Venule Maculae, Superior et Inferior* (Fig. 1355, p. 898).—The little veins running horizontally outwards from the optic papilla to the yellow spot are thus named by Toldt. Quain does not use the term *macula venulae*, saying merely, "The macula is also supplied by small vessels which pass directly to it from the papilla" (*op. cit.*, vol. iii., part iii., p. 55). The *arteriae maculae*,

superior and *inferior*, are, however, mentioned by name by Macalister.

⁴⁶⁰ *Two Principal Groups of the Layers of the Retina* (Fig. 1356, p. 899).—The layers of the retina are divided by Toldt into two principal groups—an inner, which he calls the *Gehirnschichte*, and an outer, the *Nervenepithelschichte*. Macalister, who recognises this grouping, speaks of these primary layers as *nerve elements* (or *layers*) and *neuro-epithelial elements* (or *layers*); but the German *Gehirnschichte* must be literally rendered *brain layers*. (These terms are not used by Quain.) The layers making up these two groups are enumerated in the text of Fig. 1356.

⁴⁶¹ *Rod Cell and Cone Cell* (*Ibid.*).—These terms are translations of the German words *Stäbchenszelle* and *Zapfenzelle*, used in the original German edition of this work. They denote what Quain calls *rod element* and *cone element*, respectively, but the terms used in the text are more clearly expressive of the views of Toldt, as embodied in the following passage (Von Langer and Toldt, *op. cit.*, p. 767): "The granules (*Körner*) of the outer nuclear layer combine with the rods (*Stäbchen*) and cones (*Zapfen*) to form the neuro-epithelium (*Sinnesepithel*) which lies outside the brain layer of the retina." The *rods* and *cones*, and their connexion with the granules of the outer nuclear layer, are then described, and the author proceeds: "The external granules are, in truth, nothing more than the nuclei of long-drawn-out cells, whose peripheral processes form the rods and cones. These cells are a particular kind of sensory cells, known as visual cells (*Schzellen*), which unite to form the sensory epithelium (neuro-epithelium) of the retina. A visual cell, therefore, is a greatly elongated cell, the nucleus of which (outer granule) lies in the extended middle portion of the cell, whose peripheral end bears a rod or a cone, and whose central end terminates in an arborescence in the outer molecular layer." These views should be compared with those of Quain, *op. cit.*, vol. iii., part iii., p. 46 (small print at top of page) and pp. 56 and 57 (section on the "Interconnexion of the Retinal Elements"). With Fig. 1356 Quain's Figs. 52 and 65 (*op. cit.*, tom. cit.) should also be compared.

⁴⁶² *Tarsi* (Fig. 1367, p. 902).—Macalister speaks of these as the *tarsal bodies*. They were formerly often called the *tarsal cartilages*, but this was a misnomer, as they consist purely of fibrous tissue, without any intermixture of cartilage cells.

⁴⁶³ **Annulus Conjunctivae* (Fig. 1368, p. 902).—"We distinguish the *palpebral conjunctiva*, *conjunctiva palpebrarum*, from the *ocular conjunctiva*, *conjunctiva bulbi*; the latter extends forwards to the corneal margin, where it is intimately connected with the anterior border of the sclerotic; this adherent and somewhat thin portion of the ocular conjunctiva is known as the *annulus conjunctivae*. Immediately within the annulus the conjunctival epithelium is continued, without any definite boundary, into the corneal epithelium" (Von Langer and Toldt, *op. cit.*, p. 781). The term **annulus conjunctivae* is not used by Quain.

⁴⁶⁴ *Bursa Trochlearis* (Fig. 1370, p. 903).—According to Quain (*op. cit.*, vol. ii., part ii., p. 290), "the pulley is lined by a synovial sheath"; but Macalister writes (*op. cit.*, p. 653), "The tendon is here [*i.e.*, within the pulley] invested by a very lax laminated areolar tissue with an imperfect endothelial lining in its clefts, but there is scarcely ever a true synovial membrane lining the trochlea."

⁴⁶⁵ *Fascial Sheaths of the Muscles of the Eyeball* (*Ibid.*).—"All the muscles of the eyeball are covered, as well on their bulbar as on their orbital surfaces, by fascial investments, *fascia musculares*. In the posterior part of the orbit these are thin and delicate, but they become much thicker and stronger as the

muscles approach the globe. Here they are on the one hand connected with Tenon's capsule (*fascia bulbi*), and on the other are connected by firm fibrous slips (*Fascienzipfel*) with the margin of the orbit, and more especially with the trochlea. In this manner a fixed relation is maintained between the globe and the walls of the orbit. At their thinned anterior extremities the fascial sheaths of the muscles radiate along the fornix conjunctivæ, where they become interwoven with the conjunctival submucous areolar tissue" (Von Langer and Toldt, *op. cit.*, p. 775). These fascial sheaths are usually regarded as being derived from the posterior (orbital or outer) layer of the capsule of Tenon as the muscles perforate that layer on their way to the eyeball, and are generally described in connexion with the description of Tenon's capsule. See Quain, *op. cit.*, vol. ii., part ii., p. 292; and Macalister, *op. cit.*, p. 652. Further, in vol. iii., part iii., pp. 11, 12, Quain writes: "The capsule of Tenon is strengthened just behind the places where the recti muscles perforate it by bands of fibrous tissue, and it is attached on either side to the malar and lachrymal bones by elastic ligamentous structures which also receive fibrous slips from the external and internal recti. These structures serve as check ligaments to these muscles. They are stated by Sappey to contain plain muscular fibres. Fibrous slips also pass from the sheaths of the superior and inferior rectus, and are attached to the conjunctiva palpebrarum and to the connective tissue of the eyelid." Thus, the structures to which Toldt gives the name of *Fascienzipfel* may be called in English *fibrous slips of the fascial sheaths* of the respective muscles, or, more concisely, *check ligaments*.

⁴⁹⁶ *Sulci in the Neighbourhood of the Eye* (Figs. 1380, 1381, p. 908).—"That portion of the eyelid through which the tarsus or tarsal body [see note ⁴⁹² above] extends is usually distinguished as the *tarsal portion* (*pars tarsalis*); that portion of the eyelid which lies nearer to the orbital margin (upper or lower, as the case may be), whose groundwork is formed merely by the thin palpebral fascia (*septum orbitale*), is distinguished as the *orbital portion* (*pars orbitalis*). The former portion, on account of its firm consistency, always remains smooth; whilst the latter portion, when the eye is open, falls into a fold, which disappears when the eye is closed; the boundary between the two portions of the eyelid is, however, indicated by a permanent furrow in the skin, the *sulcus orbitopalpebralis*" (Von Langer and Toldt, *op. cit.*, p. 779). These **orbitopalpebral sulci* are mentioned neither by Quain nor by Macalister. Quain writes (*op. cit.*, Appendix, p. 14): "When the eye is open the skin is drawn into the deep *superior palpebral sulcus* immediately above the upper lid, and forms a loose projecting fold between this furrow and the eyebrow. The corresponding *inferior palpebral sulcus* of the lower lid is much slighter and often broken up; it is most distinct when the eye is directed downwards." Quain's *superior* and *inferior palpebral sulci* must not be identified with the *orbitopalpebral sulci* of Toldt, the latter being merely the slight cutaneous grooves corresponding respectively to the upper margin of the upper tarsal body and the lower margin of the lower tarsal body. Quain proceeds (*op. cit.*, loc. cit.): "Another shallow groove, the *palpebromalar sulcus*, runs round from near the inner canthus of the eye, following fairly closely the lower margin of the orbit. A small *external palpebral sulcus* is continued outwards from the outer canthus for about 3 millimetres, and forms a prolongation of the palpebral cleft when the eye is closed." Macalister writes (*op. cit.*, p. 521): "Near the lower border of the upper lid is a *superior marginal sulcus* parallel to the free border." This is not indicated in Toldt's figures. "The lower lid," writes Macalister (*op. cit.*, p. 522), "is in some

eyes marked by an *inframarginal fold* [*? furrow*]. It is usually marked off from the infra-orbital region by an *infrapalpebral sulcus*; but this is inconstant, as the motion of the lower lid in opening the eye is slight. . . . Below the infrapalpebral sulcus is a variable *palpebromalar sulcus* which deepens and often becomes a characteristic marking in old age, or in wasting diseases, which gives to the eye the appearance described as *hollow*." The *infrapalpebral sulcus* of Macalister is identical with the *inferior palpebral sulcus* of Quain; Toldt calls it *sulcus infrapalpebralis*, and shows it in Figs. 1380, 1381, p. 908.

⁴⁹⁷ *Rictus Oculi or Rima Palpebrarum* (Fig. 1380, p. 908).—The term *rictus oculi* is used by Macalister to denote the cleft between the lids, through which, when the eye is open, the front of the globe is visible. In the official German nomenclature this cleft is called *rima palpebrarum*. Neither term is to be found in Quain's "Anatomy," though both are current in England. Quain speaks of the *palpebral cleft*.

⁴⁹⁸ *Commissures of the Eyelids* (Figs. 1380 to 1382, p. 908).—Neither Quain nor Macalister makes use of the term *commissure* in this connexion. The fact is that the term *canthus*, which I have employed to represent in the English nomenclature the *angulus oculi* of the official German nomenclature, has really a somewhat wider significance than the latter, and includes that of *commissura palpebrarum*. Thus, English ophthalmic surgeons speak of "dividing the outer canthus to relieve tension"; and in that case, obviously, the *commissura palpebrarum lateralis* of the Germans is denoted. The term *canthus*, indeed, which originally signified the tire of a wheel, is somewhat misapplied when used, as it habitually is in England, to denote the angles of the palpebral cleft.

⁴⁹⁹ **Intermarginal Sulcus* (Fig. 1382, p. 908).—This term is not found in Von Langer and Toldt's "Anatomy," but is evidently applied here to the flattened, rather than grooved, free margin of the lid, between the outer limbus and the inner. See also note ⁵⁰² below.

⁵⁰⁰ *Pinguecula* (Ibid.).—"A yellowish spot, looking like adipose tissue, in the conjunctiva, close to the inner or outer edge of the cornea, consists of thickened conjunctiva and subconjunctival tissue, and contains no fat. It is commonest in old people and in those whose eyes are exposed to local irritants. Though of no consequence, advice is often asked about it" (Nettleship, "Diseases of the Eye," 6th ed., p. 281).

⁵⁰¹ *Riolan's Muscle* (Fig. 1383, p. 909).—"The *deep part* of the *palpebral portion* of the *orbicularis palpebrarum muscle*, known as the *pars lachrymalis* or *Horner's muscle* . . . springs from the lachrymal crest and from the process of the internal tarsal or palpebral ligament which is attached to that crest. . . . In the lid itself this *deep portion* lies behind the follicles of the eyelashes . . . to this marginal portion of the muscle the name of *musculus ciliaris Riolani* or *musculus subarsalis* is also given" (Von Langer and Toldt, *op. cit.*, p. 780). Quain writes (*op. cit.*, vol. iii., part iii., p. 2): "A marginal fasciculus (of the orbicularis muscle) lies within the line of the eyelashes, separated by the bulbs of the lashes from the other fibres, and constituting the *ciliary bundle* or *muscle of Riolan*." The fibres of the *tensor tarsi* or *muscle of Horner*, passing outwards behind the lachrymal sac from the origin above given, are, according to Quain's description, inserted into the ciliary bundles. The name *subarsal muscle* is used by Macalister.

⁵⁰² **Rivus Lachrymalis* (Ibid.).—This term is used neither by Quain nor by Macalister, nor is any definition of it to be found in Von Langer and Toldt's "Anatomy." In the original German edition of this work the alternative name of *Thränenbach, lachrymal*

channel, is given. It denotes, I presume, the channel for the lachrymal secretion which, when the lids are closed, is formed by the apposition of the upper and lower *intermarginal sulci. See note ⁴⁸⁹ above.

⁵⁰³ *Langugo* (Fig. 1386, p. 910).—The use of this term is in England usually restricted to denote the downy crop of hairs with which an infant is covered at birth, but which are all shed within a few months thereafter. In Germany, on the other hand, *Wollhaare* or *Langugo* denotes the rudimentary hairy covering of the body throughout life, as distinguished from the specialized and fully developed hairs of the head, beard, axillæ, etc. There is no term current in England to distinguish this rudimentary hairy covering.

⁵⁰⁴ *Superior Palpebral Muscle, or Musculus Tarsalis* (Ibid.).—"Just beneath the conjunctiva, both in the upper and in the lower lid, there is a layer of smooth muscle fibres which are attached by means of thin elastic tendons to the margins of the tarsal bodies, and probably serve to keep the eye open. They are known as *musculus tarsalis superior* and *musculus tarsalis inferior*" (Von Langer and Toldt, *op. cit.*, pp. 780, 781). To the upper of these Macalister gives the name of *superior palpebral muscle*. Quain describes them, stating that the upper arises from the under surface of the aponeurotic expansion of the levator palpebræ superioris, the lower from the neighbourhood of the inferior oblique muscles, but he leaves the structures unnamed. They are among the fibres denoted by the name of *Müller's muscle*, a term liable to lead to confusion. See note ⁴⁵¹ above.

⁵⁰⁵ *Lachrymal Gland* (Figs. 1388, 1389, p. 911).—The *lachrymal gland* was till recently described, and is by many anatomists still described, as a single gland. The fore part of the gland, however, is separated from the rest by a thin fascial layer; it lies immediately beneath the conjunctiva, being in contact with the outer part of the superior fornix; to this part the name of *inferior lachrymal gland* is sometimes given, the remaining and larger portion being then known as the *superior lachrymal gland*. The *inferior lachrymal gland* is also known as the *palpebral portion* of the *lachrymal gland*, and as the *accessory lachrymal gland* (of Rosenmüller).

⁵⁰⁶ *Common Orifice of the Lachrymal Canaliculi* (Fig. 1392, p. 913).—"The canals either unite near their ends, or they open separately, but close together, into a diverticulum of the nasal sac which is known as the *sinus of Maier*" (Quain, *op. cit.*, vol. iii., part iii., p. 9). "The two [canaliculi] unite internal to the caruncula to form usually a very short tube or small sac, the *vestibulum*, which opens internally into the lachrymal sac, of which, indeed, it is only a lateral pouch" (Macalister, *op. cit.*, p. 645).

⁵⁰⁷ *Choroidal Fissure*.—The term *coloboma*, used by Toldt to denote the *choroidal fissure* (the cleft through which, in the developing eye, the mesoblast passes into the space between the lens invagination and the pigment layer of the optic cup), is in England usually employed to denote a congenital cleft in the iris, or choroid, or both, due to imperfect closure of the choroidal fissure.

⁵⁰⁸ *Subdivisions of the Concha* (Figs. 1406, 1408, p. 920).—The anterior part of the helix descends towards the external auditory meatus, but, before reaching it, curves backwards across the cavity known as the *concha*, which is thus divided by the *crus of the helix* into two parts—an upper, **cymba conche*, and a lower, **caelum conche*. These terms are not used by Quain or Macalister.

⁵⁰⁹ *Fossa of the Anthelix* (Figs. 1406, 1407, p. 920).—In England this name is usually applied to a depression on the outer surface of the auricle (see Fig. 1406). In Germany, however, this

depression is known as the *fossa triangularis*, while by the *fossa anthelice* is meant the depression on the inner surface of the auricle, below the *eminentia scapha* (see Fig. 1407).

⁵¹⁰ *Auricularis Anterior or Attrahens Auriculam Muscle* (Figs. 1412, 1413, p. 921).—It is usually stated that the superficial temporal vessels and nerve lie *beneath* this muscle. Von Langer and Toldt, however, describe the muscle as consisting of two layers, a *superficial* and a *deep*; and, according to Quain (*op. cit.*, vol. ii., part ii., p. 281), "Cruveilhier describes as normal a deep anterior auricular muscle, passing from the zygomatic process to the outer surface of the tragus." As Fig. 1412 shows, the superficial temporal vessels and nerves are *superficial* to this deep layer of the muscle.

⁵¹¹ **Cupular Portion of the Epitympanic Recess* (Fig. 1414, p. 922).—In the original German edition of this work this region of the tympanum is named *Gipfelbucht*—the word signifies literally "recess of the summit"—a term not to be found in Von Langer and Toldt's "Anatomy," nor even in the "German-English Dictionary of Medical Terms" by Treves and Lang. In the former work, however, the following passage occurs on p. 788, 789: "At the boundary between its upper and outer walls the epitympanic recess deepens to form a hemispherical fossa, which is known as the *pars cupularis recessus epitympanici*"; and on p. 805, "The head of the hammer-bone is attached by means of the superior ligament of the malleus to the cupular portion of the epitympanic recess." Bearing these facts in mind, an examination of Fig. 1423, p. 925, in which the term *Gipfelbucht* is again used, will render it evident that the latter must be identified with the *cupular portion* of the *epitympanic recess*. The term *epitympanic recess* or *aditus ad antrum* is used by Quain, but this author does not speak of the "cupular portion" of the recess. Fig. 1423 shows well the manner in which the recess, in Quain's words, "overhangs the inner end of the external auditory meatus." Why the term *Gipfelbucht* is used in this volume, in contradistinction to the Latin term *pars cupularis recessus epitympanici* in Part I. of this Atlas (see Fig. 132, p. 64) and in Von Langer and Toldt's "Anatomy," is not apparent.

⁵¹² (Figs. 1420, 1422, p. 924.) Toldt distinguishes between the *pars tensa* and the *pars flaccida membrana tympani*. The latter is usually known in England as the *membrana flaccida*. The term *pars tensa membrana tympani* is not used by Quain or Macalister; I have rendered it literally *tense portion* of the *tympanic membrane*.

⁵¹³ **Malleolar Prominence and *Stria Malleolaris* (Fig. 1420, p. 924).—"Near the upper margin of the *membrana tympani* we see also a small prominence, *prominentia malleolaris*, caused by the short process (*processus brevis vel obtusus*) of the malleus" (Von Langer and Toldt, *op. cit.*, p. 803). This term is not used by Quain or Macalister; nor does either of these authors employ the term *stria malleolaris* to denote the handle of the malleus seen through the *membrana tympani*.

⁵¹⁴ **Anterior and Posterior Malleolar Folds* (Fig. 1421, p. 924).—"The auditory ossicles are imbedded in mesentery-like folds of the mucous membrane, which, as they have free projecting borders, give rise to pouches or recesses. One of these folds is attached in front and behind to the margin of the *membrana tympani*, contains between its layers the root of the long process of the malleus and the chorda tympani nerve, and extends running parallel to the *membrana tympani*, on to the upper portion of the handle of the malleus, which divides it into a larger anterior and a smaller posterior portion; we speak, therefore, of its two parts as the *plica malleolaris anterior* and the *plica malleolaris posterior*. These folds, with the tympanic

membrane, bound two pouches, each of which has a slit-shaped, downwardly directed orifice; they are known as the *recessus membranae tympani, anterior et posterior*" (Von Langer and Toldt, *op. cit.*, p. 806). This fold is described by Quain (*op. cit.*, vol. iii., part iii., p. 96) as forming the inner boundary of the *anterior and posterior pouches of the tympanum*; but the names **anterior* and **posterior mallicolar folds* are not used by this author. They must not be confused with the *tympanomallicular folds* shown in Figs. 1420 and 1422.

⁹¹⁵ **Fold of the Incus* (Fig. 1423, p. 925).—"A second, likewise vertically disposed, fold of the tympanic mucous membrane, the *plica incudis*, is attached to the posterior wall of the tympanum, and forms the covering of the incus, from the long process of which it descends. A third, horizontal fold, the *plica stapedis*, runs from the pyramid or eminentia papillaris along the tendon of the stapedioid muscle, and covers not only the crura, but also the obturator membrane of the stapes" (Von Langer and Toldt, *op. cit.*, p. 806: this quotation is a continuation of that in note ⁹¹⁴ above). The terms **fold of the incus* and **fold of the stapes* are used neither by Quain nor by Macalister. The former is shown in Fig. 1423, p. 925, and in Figs. 1429 and 1431, p. 926; but the latter is not indicated by name in this Atlas.

⁹¹⁶ *Processus Orbicularis seu Lenticularis* (Figs. 1423, 1425, 1427, p. 925).—"This tubercle, which articulates with the head of the stapes, was formerly, under the name of *os orbiculare seu lenticulare*, described as a separate bone, which, indeed, it originally is in the foetus up to the sixth month" (Quain, *op. cit.*, vol. iii., part iii., pp. 90, 91). The old name of *os lenticulare* is used by Macalister. In the official German nomenclature the process is termed *processus lenticularis*.

⁹¹⁷ (Fig. 1423, p. 925.) The term *membrana propria*, used by Macalister to denote the *central fibrous layer* of the *membrana tympani*, is more appropriate than the term *tunica propria*, used by Quain, since *tunic* properly means a *covering*, and this is the central portion of the membrane, itself covered by an outer cutaneous and an inner mucous tunic.

⁹¹⁸ *Crura of the Stapes* (Fig. 1426, p. 925).—"The *anterior crus* of the stapes is the straighter of the two, and is therefore named by Macalister *crus rectiligneum*; the *posterior*, more curved of the two crura being by this author named *crus curvilineum*. The crura diverge from a constricted part, close to the head, known in England as the *neck* of the bone; the crura and the neck combine to form what is sometimes named the *arch* of the stapes. Neither of these latter terms is represented in the nomenclature used by Toldt.

⁹¹⁹ *Obturator Membrane of the Stapes* (Ibid.).—This membrane is described by Quain, but the name *obturator membrane* is not used by this author. Macalister speaks of it in one place as the *obturator membrane*, and in another as the *membrana obturatoria*.

⁹²⁰ *Posterior Ligament of the Incus* (Fig. 1429, p. 926).—This being the only ligament of any importance attached to the incus, Quain calls it the *ligament of the incus* without qualification. Macalister uses the Latin name, *ligamentum incudis posterius*.

⁹²¹ *Petrosphenoidal Suture* (Ibid.).—In the first (osteological) section of this work the articulation between the anterior border of the petrous bone and the great wing of the sphenoid bone is called by Toldt *fissura sphenopetrosa*, a term which in Fig. 104, p. 48, I have translated *petrosphenoidal fissure*, and in Fig. 105, p. 49, *petrosphenoidal suture*. In the former case, seen from below, it has rather the appearance of a *fissure*; in the latter, seen from above, of a *suture*. The latter also is the aspect presented in Fig. 1429, p. 926. It is, in fact, only over a small area that the apposed surfaces of the two bones are in actual contact so as to

form a *suture*; elsewhere these surfaces, and this for the greater part of their extent, form the sides of a *fissure*. *Petrosphenoidal fissure* is the name given to the articulation by Quain.

⁹²² *Roof of the Tympanum and Tegmen Tympani* (Ibid.).—Macalister uses these terms as interchangeable; according to Quain, however, the thin plate of bone known as *tegmen tympani* "also roofs over the canal of the Eustachian tube and the tensor tympani muscle" (Quain, *op. cit.*, vol. iii., part iii., p. 81). Thus, the *roof of the tympanum* forms a part only of the *tegmen tympani*. The former is distinguished by Toldt as the *paries tegmentalis cavi tympani* (cf. Fig. 133, p. 65, in Part I. of this Atlas).

⁹²³ *Secondary Tympanic Membrane* (Fig. 1431, p. 926).—Quain calls this structure the *secondary membrane of the tympanum*. The form used in the text seems preferable; and it is, moreover, a literal translation of the term *membrana tympani secundaria*, used in the official German nomenclature. Better than any of these, because more precise, is, in my opinion, the name used by Foster and some other authorities, *membrane of the fenestra rotunda*. This harmonizes, moreover, with the alternative name of the *annular ligament of the base of the stapes* (see note ⁷, p. 926).

⁹²⁴ *Cochleariform Process* (Fig. 1432, p. 927).—It should be noted that Quain designates by this term the entire **septum of the musculotubal canal* (see note ⁹²³ below), which separates the osseous portion of the Eustachian tube from the canal for the tensor tympani muscle. By Toldt this septum is named *septum canalis musculotubarii*; while by the term *processus cochleariformis* the German author denotes merely the expanded and everted end of the septum, which projects into the tympanic cavity and separates the fenestra ovalis from the tympanic orifice of the Eustachian tube. The tendon of the tensor tympani muscle bends at nearly a right angle over the cochleariform process as over a pulley. Toldt's usage of the term *processus cochleariformis* is preferable to Quain's, and is, indeed, that of many English anatomists (see also Fig. 135, p. 66, in Part I.).

⁹²⁵ *Groove of the Promontory* (Ibid.).—According to Quain, "the surface of the promontory is marked by grooves, in which lie the nerves of the tympanic plexus" (*op. cit.*, vol. iii., part iii., p. 83). Toldt, on the other hand, speaks of a single, vertical groove, *sulcus promontorii*, "a continuation of the tympanic canaliculus; in this groove the tympanic nerve (nerve of Jacobson) and the small superficial petrosal nerve meet and unite" (Von Langer and Toldt, *op. cit.*, p. 788). In Fig. 138, p. 67, Part I. of this Atlas, however, the surface of the promontory exhibits several grooves, as described by Quain.

⁹²⁶ (Fig. 1435, p. 928.) The *Eustachian cartilage* is bent in such a manner that it forms the roof, the greater part of the inner wall, and a small part of the outer wall of the cartilaginous portion of the Eustachian tube. The portion forming the inner wall is named by Toldt *lamina medialis* ("inner plate"), that forming the upper part of the outer wall *lamina lateralis* ("outer plate"), of the Eustachian cartilage. Where the cartilage is lacking, the wall of the cartilaginous portion of the tube is strengthened by a strong but flexible fibrous membrane, named by Toldt *lamina membranacea tubæ auditivæ*. By Quain this membrane is called *fascia salpingopharyngea*, a name used on the Continent in a different signification (see note ¹ to p. 436, in Part IV.), and therefore better avoided in this connexion. I have called it simply the *membranous portion of the Eustachian tube*. The parts just described are best seen in a transverse section of the Eustachian tube, as in Figs. 1437, 1438, and 1439, p. 929.

⁹²⁷ *Levator Cushion* (Ibid.).—"When the levatores palati are contracted, the upper surface of the soft palate presents a convex

eminence behind each posterior naris, called the *levator cushion*. This is occasionally seen in the dead body" (Quain, *op. cit.*, vol. iii., part iv., p. 57).

⁵²⁸ **Musculotubal Canal* (Fig. 1436, p. 929).—The name **canalis musculotubarius* is used by the author as a common name for the canal for the tensor tympani muscle and the osseous canal for the Eustachian tube (which canals are therefore called by him *semi-canal*s, viz., *semicanalis muscoli tensoris tympani* and *semicanalis tube auditivæ*, respectively), which are separated one from the other more or less completely by the **septum of the musculotubal canal* (**septum canalis musculotubarii*) or cochleariform process. The latter name, however, is better confined to the expanded and everted end of the septum, which projects freely into the tympanic cavity. See note ⁵²⁴ above.

⁵²⁹ *Crura of the Semicircular Canals* (Fig. 1442, p. 930).—In the German official nomenclature that half or limb of each semicircular canal whose extremity dilates into an ampulla is termed the *ampullary crus* (*crus ampullare*), whilst the other half or limb of the canal is termed the *simple crus* (*crus simplex*). Further, the non-ampullary or undilated extremities of the superior and posterior semicircular canals unite before opening into the vestibule to form what is termed the *common crus* (*crus commune*). (See Von Langer and Toldt, *op. cit.*, p. 792.) These terms are sometimes used in England also.

⁵³⁰ *Whorls of the Cochlea* (Figs. 1440, 1441, p. 930).—The term *whorl* is employed by Macalister and by Foster, and is probably that most generally used in speaking of the convolutions of the cochlea; by Quain, however, the terms *coil* and *turn* are employed indifferently.

⁵³¹ *Macula Cribrosa Superior* (Fig. 1442, p. 930).—This term is used by Macalister, but not by Quain. It denotes the cribriform area at the upper end of the crest of the vestibule, the foramina of which correspond with those of the *area cribrosa superior* (*area vestibularis superior*, according to Toldt) of the fundus of the internal auditory meatus or reniform fossa (see Fig. 140, p. 68, in Part I. of this Atlas), and transmit the filaments of the superior division of the auditory nerve, or vestibular nerve, which supplies the utricle and the ampullæ of the superior and external semicircular canals.

⁵³² *Macula Cribrosa Media* (Ibid.).—This term is used by Macalister, but not by Quain. It denotes the cribriform area in the lower part of the fovea hemispherica, the foramina of which correspond with those of the *area cribrosa media* (*area vestibularis inferior*, according to Toldt) of the fundus of the internal auditory meatus or reniform fossa (see Fig. 140, p. 68, in Part I. of this Atlas), and transmit the filaments of the nerve to the sacculle.

⁵³³ *Macula Cribrosa Inferior* (Ibid.).—This term is used by Macalister, but not by Quain. The smallest of the three cribriform areas of the vestibule, it is situated close to the ampullary orifice of the posterior semicircular canal. Its foramina lead to the *foramen singulare* of the fundus of the internal auditory meatus or reniform fossa (see Fig. 140, p. 68, in Part I. of this Atlas), and transmit the filaments of the posterior ampullary nerve.

⁵³⁴ **Area of the Cochlea* (Fig. 1448, p. 932).—"Much the greater part of the lower division [*inferior fossa*, Quain] of the fundus of the internal auditory meatus [i.e., of the region below the *transverse crest* or *crista falciformis*] is occupied by the *area cochleæ*; this depressed area corresponds to the base of the cochlea, and is occupied by the *tractus spiralis foraminosus*" (Von Langer and Toldt, *op. cit.*, p. 795). "In the inferior fossa are seen (1) the *area cribrosa media* . . . ; (2) the *foramen singulare* . . . ; and (3)

the *tractus spiralis foraminulentus*, for the cochlear division of the auditory nerve, a series of minute holes beginning below the *area cribrosa media*, forming one turn and a half in a depression corresponding to the base of the cochlea, and ending at the *foramen centrale cochleæ*, the orifice of the central canal of the modiolus" (Quain, *op. cit.*, vol. ii., part i., p. 43). Quain appears to use the term *tractus spiralis foraminulentus* in a double sense, but it seems better to limit its signification to the spirally arranged series of foramina, and to adopt the name *area of the cochlea* for the whole area corresponding to the base of the cochlea. See also Fig. 140, p. 68, in Part I.

⁵³⁵ *Spiral Septum separating the Whorls of the Cochlea* (Fig. 1452, p. 934).—By a strange oversight the *complete osseous septum* between the whorls of the cochlea, upon which the separation of the cavity of that organ into a coiled tube depends, has been left unnamed by Quain and also by Macalister. Nor is there any term for it in the official Latin nomenclature of the German Anatomical Society. Toldt calls it the *Zwischenwand* (*partition-wall*), a name which is insufficiently distinctive. The name used in the text of Figs. 1451 and 1452, p. 934, *spiral septum separating the whorls of the cochlea*, is cumbersome; but to speak of it as the *spiral septum* alone might lead to confusion with the *incomplete septum* known as the *osseous spiral lamina*.

⁵³⁶ *Spiral Osseous Canal of the Cochlea* (Fig. 1451, p. 934).—The term *spiral osseous canal* is used by Quain to denote the cavity of the cochlea when the membranes have been removed. To speak simply of the *spiral canal of the cochlea* (a literal translation of the term *canalis spiralis cochleæ* used by Toldt) might lead to confusion with the *spiral canal* of the intact cochlea situated between the *scala vestibuli* and the *scala tympani*. This canal was formerly known as the *scala media*, but is now usually termed the *canal of the cochlea* or *canalis cochleæ*; it is also known as the *canalis membranaceus cochleæ*, and as the *ductus cochlearis*. This last name, *ductus cochlearis*, being the one always used in Germany to denote the *cochlear canal* of English authors, no confusion is liable to arise in that country with the *canalis spiralis cochleæ*.

⁵³⁷ **Lamina Modioli* (Figs. 1451, 1452, p. 934).—This term is not used by Quain or Macalister, and I therefore quote the following definition from Von Langer and Toldt (*op. cit.*, p. 793): "An independent axis exists within the windings of the cochlea just as little as within those of a snail-shell. If, however, we break into the spiral tube of a snail-shell from without, we find that those parts of the wall of the tube adjacent to the geometrical axis of the coil combine to form an apparent columnar axis. It is the pseud-axis of the cochlea formed in this manner that is known as the *modiolus*. In the two complete whorls the circumference of this axis is likewise complete, so that it forms a small hollow column, with an aperture in the centre of the base of the cochlea; in the apical whorl, however, which is a half-turn merely, the circumference of the axis is incomplete, and has the form of a ledge projecting from the wall, which ascends perpendicularly [see note ⁵⁴⁰ below] to the cupola, and is known as the **lamina modioli*."

⁵³⁸ **Area of the Facial Nerve* (Fig. 1453, p. 934).—In note ⁵³⁴ above, dealing with the terminology of the parts of the fundus of the internal auditory meatus or reniform fossa, the division of this region into a smaller *superior fossa* and a larger *inferior fossa* by means of a horizontal ridge known as the *transverse crest* or *crista falciformis* was described. In the bottom of the superior fossa is the *area cribrosa superior* (*area vestibularis superior*, according to Toldt), transmitting the filaments of the superior division of the auditory nerve, or vestibular nerve; while on the anterior wall of the fossa is the orifice of the aqueduct of

Fallopian. This latter, in the German official nomenclature, is known as the *area nervi facialis*.

⁵³⁹ *Longitudinal Canals of the Modiolus* (Ibid.).—This term, denoting the finer canals of the axis of the cochlea—all the canals, that is to say, besides the *central canal* and the *spiral canal of the modiolus*—is not used by Quain. The structures in question are, however, described by this author in the following terms (*op. cit.*, vol. iii., part iii., pp. 102, 103): "The central part of the modiolus is spongy as far as the last half-coil, and is pierced by many small canals, for the passage of the nerves and vessels to the spiral lamina; one of these canals, larger than the rest, *central canal of the modiolus*, runs from the base through the centre of the modiolus. The base of the modiolus appears in the internal auditory meatus as the *fossula cochleæ* containing the *foramen centrale* and the *tractus spiralis foraminulentus*; the latter transmitting the nerve fibres of one and a half turns of the cochlear tube, the former being continued into the central canal of the modiolus and transmitting the nerve fibres for the uppermost turn." The *fossula cochleæ* thus briefly alluded to by Quain is the portion of the fundus of the internal auditory meatus or reniform fossa called by Toldt *area cochleæ* (see note ⁵³⁴ above). In Fig. 114, p. 103 (*op. cit.*, *tom. cit.*), Quain calls it, not *fossula*, but *fovea cochleæ*. It must not be confounded with the *recessus cochlearis*, a minute depression on the inferior wall of the vestibule in which the blind basal extremity of the ductus cochlearis or canal of the cochlea is lodged (see Fig. 1442, p. 930).

⁵⁴⁰ *Conventional Description of the Cochlea* (Ibid.).—In note ⁵³⁷ above, the *lamina modiolii* is said to ascend *perpendicularly* to the cupola of the cochlea. It can be said to do so only if the axis of the cochlea is considered as vertical, for descriptive purposes. "In the natural position," says Foster ("Physiology," 5th ed., 1891, p. 1340), "the cochlea is nearly horizontal with the beginning of the first whorl in the base abutting on the median wall of the tympanum, and with the apex directed forwards and towards the median line; but when we are dealing with it by itself it will be convenient to consider it as if it were vertical in position, with the apex above and the base below." Quain acts on the same convention in his description of the isolated cochlea (*op. cit.*, vol. iii., part iii., p. 113, footnote), and adds that parts nearer the columella (modiolus) are spoken of as *inner*, parts nearer the external wall as *outer*. In the use, indeed, of such terms as *apex* and *cupola* the assumption in question is implied.

⁵⁴¹ *Tractus Spiralis Foraminulentus* (Fig. 1455, p. 935).—This is the spirally arranged series of foramina, the apertures of the *longitudinal canals of the modiolus*, transmitting the filaments of the cochlear nerve to the basal and middle whorls of the cochlea; in the centre of the spiral is a larger foramen (*foramen centrale cochleæ*), the aperture of the *central canal of the modiolus*, transmitting that part of the cochlear nerve which supplies the apical half-whorl of the cochlea. Strictly speaking, the application of the term *tractus spiralis foraminulentus* should be limited to the spiral groove in which the foramina are situate; the whole of the shallow depression which the spiral groove itself occupies, corresponding as it does to the centre of the base of the cochlea—that is, to the base of the modiolus—being by Toldt named *area cochleæ*, and by Quain *fossula* or *fovea cochleæ*. (See also notes ⁵³⁴ and ⁵³⁹ above.)

⁵⁴² *Ossous and Membranous Semicircular Canals* (Figs. 1456 to 1458, p. 936).—In the German official nomenclature the membranous semicircular canals are termed *ductus semicirculares*. This usage is at once concise, and avoids the possibility of confusion; but to speak in English of the *semicircular ducts*

would be too much of an innovation, and I have therefore introduced the word *membranous* in parentheses in all cases in which the *membranous canals* are denoted. In all cases in which the term *semicircular canal* is used in this work without that qualification, one of the *osseous canals* is indicated.

⁵⁴³ *Crista Acustica* and **Ampullary Sulci* (Fig. 1456, p. 936).—"Each of the membranous ampullæ exhibits on its outer surface a groove traversing nearly half its circumference, known as the *sulcus ampullaris*, along which bundles of the auditory nerve enter the wall of the ampulla. This groove corresponds to a sickle-shaped fold in the interior of the ampulla, the *crista ampullaris*, covered by the sensory epithelium" (Von Langer and Toldt, *op. cit.*, p. 796). Quain calls the whole projection *septum transversum*, and its most prominent part, surmounted by the auditory epithelium, the *crista acustica*, and it is this latter name which is commonly used in England to denote the *crista ampullaris* of the German official nomenclature. "Beyond each rounded end of the crista," continues Quain (*op. cit.*, vol. iii., part iii., p. 108), "is a crescent-shaped edge (covered by columnar epithelium) which has been termed *septum semilunatum*." Neither this term nor the term *septum transversum* is used by Toldt; Quain, on the other hand, does not use the term *sulcus ampullaris* or any equivalent thereof. Macalister describes the sulcus without giving it any distinctive name. He writes (*op. cit.*, p. 685): "On the sacculus and on each ampulla there are thickened areas circumscribed and projecting into their cavities; each ampulla is crossed by a transverse *crista acustica*, marked externally by a slight depression. The similar spots on the inner wall of the sacculus and utricle are called *macula acustica*." As the English equivalent of *sulcus ampullaris*, I use in the text a literal translation, **ampullary groove*. (See Fig. 1462, p. 938.)

⁵⁴⁴ *The Vestibular Nerve* (Figs. 1457, 1458, p. 936).—Toldt's description and nomenclature of the superior division of the auditory nerve or vestibular nerve differ somewhat from those of Quain. "The vestibular nerve consists of two branches—an *upper*, *ramus utriculo-ampullaris*, and a *lower*, *ramus sacculo-ampullaris*. The *utriculo-ampullary nerve* consists of the united *utricular nerve*, *superior ampullary nerve*, and *external ampullary nerve*; the *sacculo-ampullary nerve* consists of the united *sacculus nerve* and *posterior ampullary nerve*" (Von Langer and Toldt, *op. cit.*, pp. 788, 789). According to Quain, on the other hand, the *superior division of the auditory nerve*, or *vestibular nerve*, supplies only the *utricular nerve*, *superior ampullary nerve*, and *external ampullary nerve*—consists, that is, of the filaments that emerge from the *macula cribrosa superior* (see note ⁵³¹ above)—and is thus really identical with the **utriculo-ampullary branch* of Toldt. The *inferior division of the auditory nerve*, on the other hand, divides into (a) a *posterior branch* (identical with Toldt's **sacculo-ampullary branch*) which supplies the *sacculus nerve*, emerging from the *macula cribrosa media* (see note ⁵³² above), and the *posterior ampullary nerve*, emerging from the *macula cribrosa inferior* (see note ⁵³³ above); and (b) an *anterior branch*, which is the *cochlear nerve*. Yet another classification of these branches is adopted by Macalister (*op. cit.*, p. 684), apparently based upon, and yet differing slightly from, that of Schwalbe. Quain's grouping of the branches would, however, seem to be that most in accordance with the anatomical data.

⁵⁴⁵ **Vestibular Cæcum*, and **Cupolar Cæcum* or *Lagena* (Fig. 1458, p. 936).—The name of **cæcum vestibulare* is given by Toldt to the blind extremity of the canal of the cochlea at the base of that organ, **cæcum cupulare* to the blind extremity at the apex. These terms are not used by Quain, who, however, speaks of the latter as the *lagena*.

⁵⁴⁸ *Cavity of the Cochlea* (Ibid.).—The term here translated *cavity of the cochlea* is in the original German *Schneckenkanal*, a literal rendering of which as *cochlear canal* would be likely to lead to confusion. The *cavity* or *canal* here designated is the interior of the membranous cochlea considered as a whole, without regard to its interior subdivisions into *scala vestibuli*, *scala tympani*, and *ductus cochlearis*. Concerning the author's use of a similar term to denote the interior of the osseous cochlea considered as a whole, viz., the *spiral osseous canal of the cochlea*, see note ⁵⁵⁸ above.

⁵⁴⁷ *Ductus Perilymphaticus* (Fig. 1459, p. 937).—This name is not used by Quain or Macalister. According to Von Langer and Toldt (*op. cit.*, p. 798), "The canaliculus cochleæ (aqueduct of the cochlea) conveys the *ductus perilymphaticus*; this leads downwards from the scala tympani quite close to the fenestra rotunda, and at the inferior (or posterior) border of the petrous portion of the temporal bone [see Fig. 133, p. 65, in Part I.], through the external orifice of the aqueduct of the cochlea [see Fig. 128, p. 62, and Fig. 129, p. 63, in Part I.], a communication is effected between the perilymphatic space and the subdural space." According to Quain (*op. cit.*, vol. iii., part iii., p. 104), "Close to the commencement of the scala tympani is the orifice of a small canal (*aqueductus cochleæ*), which extends downwards and inwards to the lower border of the petrous bone, where it opens into a depression immediately in front of the jugular fossa. It transmits a small vein which joins the inferior petrosal sinus. There is also a communication along the aqueductus cochleæ between the subarachnoid space and the perilymph in the scala tympani." The communication is rather, as described by Quain, of the nature of a perivascular lymph space (resembling those perivascular spaces in the tunica adventitia of the bloodvessels of the brain and the spinal cord which communicate with the subarachnoid space at the surface of those organs), than a distinct duct, as described by Von Langer and Toldt. On the other hand, since the vein of the aqueduct of the cochlea joins the inferior petrosal sinus, which runs between the layers of the dura mater, the perilymphatic space in question must join the *subdural space* (as stated by Von Langer and Toldt), and not the *subarachnoid space* (as stated by Quain). The latter author's error is, however, probably a mere clerical error. Macalister says merely (*op. cit.*, p. 634): "A fine opening starts from the beginning of the floor of the scala tympani and passes down to the side of the basilar surface of the petrous bone as the *aqueductus cochleæ*; veins and lymphatics traverse it."

⁵⁴⁸ *Vestibular Nerve* (Fig. 1465, p. 939).—The term *nervus vestibuli* as used by Toldt is more comprehensive than the term *vestibular nerve* as used by Quain, embracing as it does, in addition to the *tricular nerve*, the *superior ampullary nerve* and the *external ampullary nerve* (which constitute the *vestibular nerve* or *superior division of the auditory nerve*, according to Quain), the *sacculus nerve* and the *posterior ampullary nerve* (which latter are regarded by Quain as constituting a distinct *posterior branch of the inferior division of the auditory nerve*). See also note ⁵⁴⁴ above, and notes ⁵ and ⁶ to p. 937.

⁵⁴⁹ *Spiral Prominence* (Fig. 1466, p. 939).—This is described by Quain, although the name *spiral prominence* is not actually employed by this author. He writes (*op. cit.*, vol. iii., part iii., p. 119): "There is usually a slight inward projection [on the outer wall of the cochlear canal] a little above the spiral ligament, containing a prominent bloodvessel." This "inward projection" is that named *prominentia spiralis* in Toldt's Fig. 1466, p. 939. The "prominent bloodvessel" is also visible in the same

figure, but is left unnamed. Quain, in his Fig. 135 (*op. cit.*, tom. cit., p. 118), names it the *vas prominens*, the name used by Toldt in Fig. 1468, p. 940.

⁵⁵⁰ **Arterial Glomerulus of the Cochlea* (Ibid.).—"The offsets of the cochlear branch [*ramus cochleæ*], one of the two terminal branches of the internal auditory artery] enter the canaliculi of the modiolus, and form loops or actual glomeruli, the *glomeruli arteriosi cochleæ*, and from these latter arise the fine terminal branches to the spiral ganglion and to the nerve expansion in the osseous spiral lamina as well as to the wall of the scala vestibuli and to Reissner's membrane" (Von Langer and Toldt, *op. cit.*, p. 799). Quain describes "a spirally arranged glomerulus-like arterial plexus" in the outer wall of the cochlea (*op. cit.*, vol. iii., part iii., p. 126), but makes no mention of glomeruli on the vessels in the canals of the modiolus and the osseous spiral lamina.

⁵⁵¹ *The Bloodvessels of the Labyrinth* (Figs. 1467, 1468, p. 940).—Quain's account of these vessels is not very minutely detailed, and for this reason many of the names used on this page are not to be found in Quain's "Anatomy." According to Von Langer and Toldt, whose account I here summarize (*vide op. cit.*, pp. 799, 800), the *internal auditory artery* (*arteria auditiva interna*), a branch of the *basilar artery* (*arteria basilaris*)—see Fig. 1007, p. 619, Fig. 1011, p. 622, and Fig. 1012, p. 623, in Part V.—accompanies the auditory nerve into the internal auditory meatus. After giving off a considerable *vestibular branch* (*ramus vestibularis*), which supplies the macula acustica of the sacculus and utricle, and the ampullæ of the superior and external membranous semicircular canals, the *internal auditory artery* divides into its two terminal branches. One of these, the *cochlear branch* (*ramus cochleæ*), supplies the middle and apical whorls of the cochlea; the branches of this vessel are described in note ⁵⁵⁰ above. The other terminal branch, the *vestibulocochlear branch* (*ramus vestibulocochlearis*), supplies the basal whorl of the cochlea, the sacculus and the utricle, and the ampulla of the posterior membranous semicircular canal. The branches to the ampullæ give off fine arterial twigs along the membranous semicircular canals. The *veins of the labyrinth*, *internal auditory veins* (*vena auditiva interna*), combine for the most part to form two trunks. One of these, the *vein of the aqueduct of the vestibule* (*vena aqueductus vestibuli*), is formed by the coalescence of capillaries from the utricle and the semicircular canals, and terminates in the superior petrosal sinus. The other, the *vein of the aqueduct of the cochlea* (*vena canaliculi cochleæ*), receives the veins of the cochlea and small *vestibular veins* (*vena vestibulares*), and terminates in the bulb of the internal jugular vein (see note ⁵⁴⁷ above, and also Appendix to Part V., note ¹²³). The principal radicle of the cochlear veins is the *spiral vein of the modiolus* (*vena spiralis modiolii*), which runs in the axial wall of the scala tympani; the venules opening into this trunk surround the wall of the scala tympani, whereas the terminal branches of the arteries surround the wall of the scala vestibuli. In the internal auditory meatus is a companion vein (sometimes wanting) to the internal auditory artery; this vessel is more particularly distinguished as the *internal auditory vein* (*vena auditiva interna*). It empties itself into the inferior petrosal sinus, and represents a collateral channel for the cochlear veins. The fine anastomoses of the vessels of the labyrinth with the vessels of the tympanum are effected by means of the bloodvessels of the petrous portion of the temporal bone.

⁵⁵² *Vas Spiroale* (Fig. 1468, p. 940).—This vessel, though figured in Toldt's Atlas, is omitted by Von Langer and Toldt from their description of the vessels of the labyrinth (see note ⁵⁵¹

above). Quain, however, writes (*op. cit.*, vol. iii., part iii., p. 117): "Small bloodvessels are found in the basilar membrane, as a rule extending only over its inner part. They are usually terminated by a rather large longitudinally running vessel, situated opposite the outer rods of Corti, and known as the *vas spirale*."

⁵³³ *Cartilage of Jacobson* (Fig. 1471, p. 943).—In the specimen shown in Fig. 1471 this cartilage barely comes into contact with the vomer, the end of that bone being truncated, and thus the cartilage hardly seems to deserve its alternative names of *vomerine cartilage* or *cartilago vomeronasalis*. When the extremity of the vomer is pointed, however (a condition which the name of the bone implies to be normal), the point extends so far forward that a considerable part of the narrow cartilage of Jacobson lies between the vomer below and the cartilage of the septum above.

⁵³⁴ **Eminence of Jacobson* (Fig. 1472, p. 943).—This term is a translation of the term *Jacobson'scher Wulst* used in the original German edition of this work. Macalister (*op. cit.*, p. 635) describes a slight oblique thickening on the anterior and inferior part of the nasal septum, at the anterior extremity of which is the orifice of a blind pouch, the rudiment of the organ of Jacobson. This thickening is the **eminence of Jacobson*, to which no distinctive name is given either by Macalister or by Quain.

⁵³⁵ **Lateral Crest of the Septum* (Fig. 1475, p. 945).—This term is not used by Quain or Macalister. As Fig. 1475 shows, something more than the common deviation of the septum is denoted. Von Langer and Toldt write (*op. cit.*, p. 92): "Not infrequently we find on the wall of the septum of the nose, in the region of the vomer, a horizontal ridge, *crista lateralis septi*, projecting to one side or the other; or the vomer as a whole may be curved towards one side. In this manner the size of one side of the nasal cavity may be greatly restricted."

⁵³⁶ *Cavernous Plexus of the Turbinals* (Fig. 1476, p. 945).—This name is not actually used either by Quain or by Macalister. Quain, however, describes the veins as forming "a dense plexus in the mucous membrane, those in the deeper parts of the membrane being especially large, and closely arranged, so as almost to approach the structure of cavernous tissue. This is most largely developed over the whole lower turbinal, the lower and hinder border of the middle turbinal, and the hinder end of the upper turbinal, as well as on the lower and hinder part of the septum" (*op. cit.*, vol. iii., part iii., p. 145); while Macalister speaks of "patches of vascular tissue simulating erectile tissue" (*op. cit.*, p. 635).

⁵³⁷ *Meatus Supremus and Concha Suprema* (Ibid.).—"Above and behind the superior turbinal bone, the openings of the sphenoidal and sphenoidal cells form a depression, the *meatus supremus*, over which there is sometimes a small bony plate, the *concha suprema*" (Macalister, *op. cit.*, p. 231). In another place (p. 637) Macalister speaks of the *meatus supremus* as the *fourth meatus*. This, it will be noted, he describes as constant, the *concha suprema* only as a variety.

⁵³⁸ *Meckel's Space* (Fig. 1478, p. 947).—The hollow in the dried skull, close to the apex of the petrous bone, on its anterior or upper surface, in which the Gasserian ganglion lies, is known as the *fossa of the Gasserian ganglion*, or *impressio trigemini* (see Fig. 130, p. 63, in Part I.). In the fresh skull this surface is, of course, covered with dura mater. Further, the outer edge of the tentorium cerebelli being attached to the superior border of the petrous bone and also to the posterior clinoid process, between these two attachments this portion of the dura mater "bridges

over the impressio trigemini on the upper surface of the apex of the petrous bone, and thus closes in the space for the reception of the Gasserian ganglion. This space is the *cavum Meckelii*" (Von Langer and Toldt, *op. cit.*, p. 668).

⁵³⁹ *Epidermis* (Fig. 1484, p. 950).—The *epidermis* is also known as the *scarf-skin* or *cuticle*; but the signification of the term *cuticle* is often restricted to the *stratum corneum* and *stratum lucidum*, which are thus grouped together in contradistinction to the *rete mucosum* or *Malpighian layer*. This latter is also subdivided into three layers (distinguishable only under a higher magnification than that of Fig. 1484); in their order from without inwards, these are named *stratum granulosum*, *stratum spinosum*, and *stratum columnare*.

⁵⁴⁰ *Hair-Bulb and Hair-Knob* (Fig. 1489, p. 952).—Von Langer and Toldt distinguish between these structures in the following terms (*op. cit.*, p. 818): "Growing hairs end in a hollow bulbous enlargement, the *hair-bulb* (*bulbus pili*, *Haarzweibel*), into the interior of which the hair-papilla projects, the substance of which is composed of closely packed and, as a rule, deeply pigmented cells. *Full-grown hairs*, on the contrary, terminate in a somewhat pointed *hair-knob* (*Haarkolben*), which, like the cortical substance of the shaft or stem of the hair, is entirely composed of spindle-shaped cortical cells." Quain speaks of the *bulbus pili* (*Haarzweibel*) indifferently as *hair-bulb* and *hair-knob*, and of the *Haarkolben* as a *modified hair-bulb*. The term *hair-knob*, however, is a literal translation of *Haarkolben*.

⁵⁴¹ *Inner Root-Sheath* (Figs. 1489, 1491, p. 952).—In the middle portion of the hair-follicle the *inner root-sheath* itself consists of three distinct layers, which are left unnamed by Toldt in the original German edition of this work. As, however, they are well shown in Fig. 1491, I have indicated them in the text to that figure. These layers are: (1) An outer, fenestrated, non-nucleated layer of flattened cells, known as *Henle's layer*; (2) an intermediate layer of polygonal nucleated cells, often two or three rows deep (though consisting of a single row only in Fig. 1491), known as *Huxley's layer*; and (3) a layer of imbricated, downwardly projecting scales, interdigitating with the upwardly pointing scales of the cuticle proper of the hair, and known itself as the *cuticle of the root-sheath*. Near the mouth and also near the fundus of the follicle, Henle's layer and Huxley's layer are no longer separable, being represented by a single continuous layer of large polygonal nucleated cells. As a whole the inner root-sheath is continuous with the stratum corneum (see note ⁵³⁹ above).

⁵⁴² *Dermic Coat of the Hair-Follicle* (Ibid.).—As the epidermic coat of the follicle is continuous with and represents the epidermis of the cutaneous surface, so the dermic coat is continuous with and represents the corium. There are no concise and well-established names in English for the layers of this dermic coat, which in the text to Figs. 1489 and 1491 I have called *outer fibrous layer*, *inner fibrous layer*, and *hyaline layer*, respectively, these terms being literal translations of the German names used by the author in the original. Macalister describes these layers in the following words (*op. cit.*, p. 94): "(1) A condensed layer of the stratum reticulare of the cutis, with longitudinal fibres and connective cells, lying upon (2) a modified extension of the papillary layer, with transverse, flattened connective cells and a few unstriated fibres; (3) a homogeneous basement membrane internally." Quain describes the first and second layers in similar terms, and of the third layer he writes (*op. cit.*, vol. iii., part iii., p. 422): "The most internal layer (*hyaline layer*, Kölliker) is a transparent homogeneous membrane, marked transversely on its inner surface with some raised lines, and not reaching so high as

the mouth of the follicle; it corresponds with the *membrana propria* or basement membrane of allied structures." The looser connective tissue of the *outer fibrous layer*, the *circular fibres* of the *inner fibrous layer*, and the thin, structureless *hyaline layer*, are well shown in Fig. 1491. Next within the last-named is the broad *outer root-sheath*, consisting of several layers of polygonal cells (this corresponds with the Malpighian layer of the general surface of the skin), and then the trilaminar *inner root-sheath*, fully described in the last note. Finally we reach the *cortical* and then the *medullary substance* of the hair proper. (The *hair-cuticle* is not shown either in this figure or in any of the others.)

⁵⁶³ *Retinacula of the Skin* (Fig. 1493, p. 953).—"Clearly defined and firm connexions between the skin and subjacent structures also exist in the form of the so-called *retinacula cutis*; these are tense bands of connective tissue, which are usually attached to bony prominences, radiating thence to determinate areas of skin" (Von Langer and Toldt, *op. cit.*, p. 822). In this instance the **retinacula* pass from the *epicranial* or *occipitofrontal aponeurosis* (*galea aponeurotica*) to the skin covering that membrane. In English works on anatomy the intimate connexion between these two layers of the scalp is always described. Ellis, for instance, writes (*op. cit.*, pp. 2, 3): "Superficial to the aponeurosis are the vessels and nerves of the scalp and a small quantity of fat, which is traversed by numerous short fibrous bands uniting it closely to the skin." But neither this author, nor Quain, nor Macalister, denotes these fibrous bands by the name **retinacula cutis*.

⁵⁶⁴ *Lines of Cleavage of the Skin* (Figs. 1496, 1497, p. 954).—The subject of the "cleavage" (*Spaltbarkeit*) of the skin, which has important practical bearings on both dermatology and surgery, was first investigated by C. Langer and S. Swerchesky, and

was discussed at considerable length by O. Simon. A short account of the matter is to be found in Von Langer and Toldt's "Anatomie," 7th ed., pp. 824, 825; and the subject is also alluded to briefly by Crocker ("Diseases of the Skin," 1888, p. 13 *et seq.*), who gives a list of authorities.

⁵⁶⁵ *Hair-Streams and Hair-Whorls* (Figs. 1498, 1499, p. 955).—"Since the hair-follicles are inserted obliquely into the skin, the shafts or stems of the hairs are disposed in layers, and in those areas in which they are arranged in rows they form *hair-streams*, *flumina pilorum*. Where, on the other hand, the roots of the hairs approximate as they recede from the surface, *hair-whorls*, *vortices pilorum*, are formed, as on the vertex cranii. Such a whorl is also occasionally met with over the coccyx, the *coccygeal whorl*, *vortex coccygeus*" (Von Langer and Toldt, *op. cit.*, p. 826).

⁵⁶⁶ *Vallum Unguis* (Figs. 1502, 1503, 1505, p. 956).—This name (*Nagelwall* in the vernacular) is given in Germany to the fold of skin surrounding and overlapping the nail and forming the outer boundary of the marginal groove of the nail-bed (*sulcus matrixis unguis*). Macalister, however, distinguishes between the portion of the *vallum* overlapping the root or concealed margin of the nail and the portions overlapping the lateral margins of the nail, terming the former *nail-fold* and the latter *nail-walls* (*op. cit.*, p. 277).

⁵⁶⁷ *Epidermic Portion of the Nail, or Nail proper* (Figs. 1504, 1505, p. 956).—In Fig. 1504 Toldt describes this as the *stratum corneum*, and Quain (*op. cit.*, *tom. cit.*, p. 419) also says that this part of the nail "corresponds in nature with the horny layer." According to Macalister, however (*op. cit.*, p. 277), this part of the nail "represents an enormously developed *stratum lucidum*, over the base of which is a soft fold, the partially developed *stratum corneum*, or *eponychium*." See also note ⁵⁶⁹ above.

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INDEX
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INDEX

TO THE NEUROLOGY AND TO THE ORGANS OF THE SENSES

Certain names in this Index have an asterisk (*) prefixed; these, as more fully explained in the Translator's Preface being terms that form part of the English nomenclature used in this work, but which are not commonly employed by English anatomists. To other names a dagger (!) is prefixed; these are Latin names used by the author in the original work, but not included in the official nomenclature of the "Anatomische Gesellschaft." Abbreviation: App.=Appendix.

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pupillary, 896 and App., note ⁴⁸⁷

Zonule of Zinn, 892, 893, 901, and App., note ⁴⁸⁰

Zonula ciliaris [Zinni], 892, 893, 901

*Zonular spaces, 893, 895, and App., note ⁴⁸⁹

THE END.

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